

MACWORLD

August 1985 \$3.95

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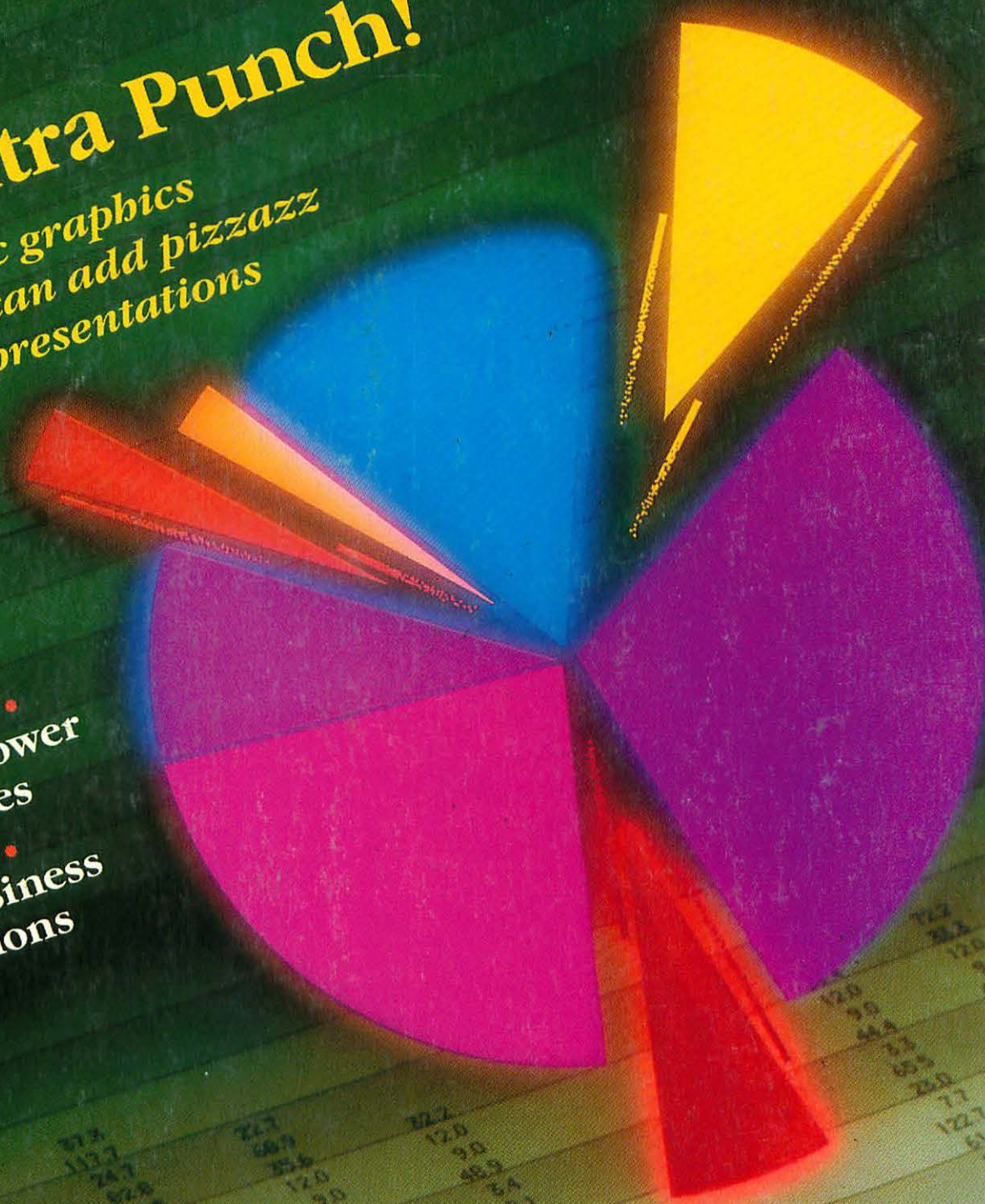
The Macintosh™ Magazine

The Extra Punch!

How Mac graphics
can add pizzazz
to your presentations

.....
Three Power
Databases

.....
New Business
Applications



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the heat off
your Mac.

MACBCOOL™

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A cooling enhancement module designed to keep your Macintosh cool and eliminate the threat of overheating.

FORCED AIR COOLING with a quiet efficient fan providing a continuous flow of fresh air through your Macintosh. The results are better reliability and longer operating life of your computer.

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BUILT-IN SURGE PROTECTION provides extra protection against power line surges, fluctuations, and noise which can cause permanent damage or intermittent operation to sensitive computer equipment.

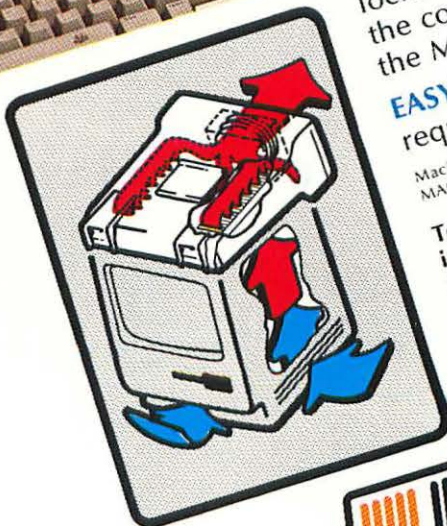
A PERFECT FIT because MACBCOOL is designed specifically for the Macintosh Computer. When positioned on the computer, a sturdy handle firmly locks the MACBCOOL module to the computer and substitutes for the Mac's built-in handle.

EASY INSTALLATION. No tools required.

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MACWORLD

August 1985

The Macintosh™ Magazine

Getting Started

80 Presentations with Punch

Gordon McComb

Get visual in your presentations with the Mac's graphics and programs that embellish text, generate charts, simulate slide shows, and even animate images.

State of the Art

88 Illuminating Objects

Richard Sprague

Derived from FORTH and inspired by Smalltalk, Neon is a new-age language designed for Macintosh programming.

Review

94 Data That Means Business

Jim Heid

Keystroke, *MacLion*, and *Omnis 2* represent a second, more powerful generation of Macintosh database management programs, with file security, relational capability, and other no-nonsense features.

108 In Search of a Better Mouse

Gordon McComb

When you're ready to put your money where your mouse is (or was), explore the alternatives offered by trackballs, joysticks, optical and bar-code readers, other mice, and even a headset.

Hands On

116 Three Bedrooms, Two Baths, One Mac

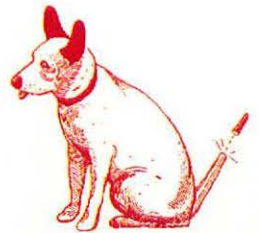
Jim Heid

With its picture field and flexible form design, *Microsoft File* is open to specialized applications, such as a real estate database with digitized photos of properties on sale.

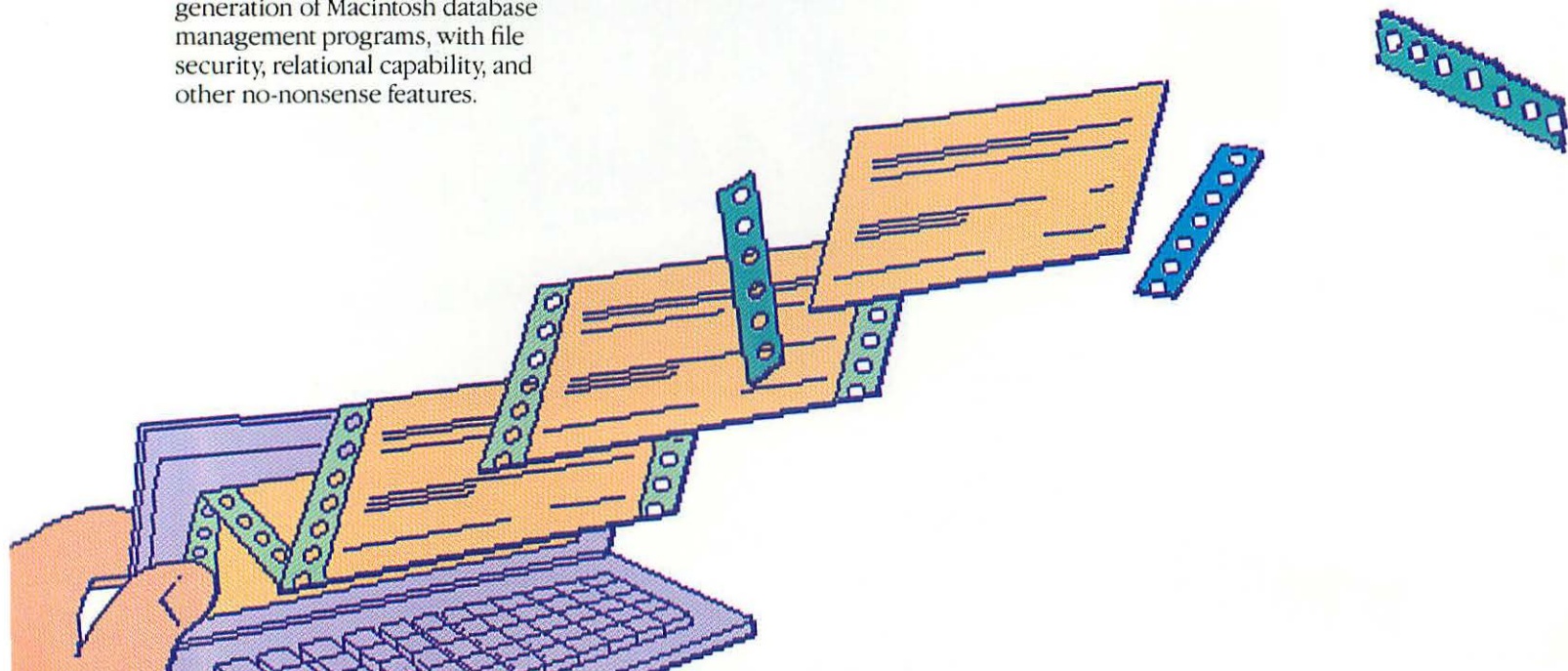
124 Snowflakes and Dragons

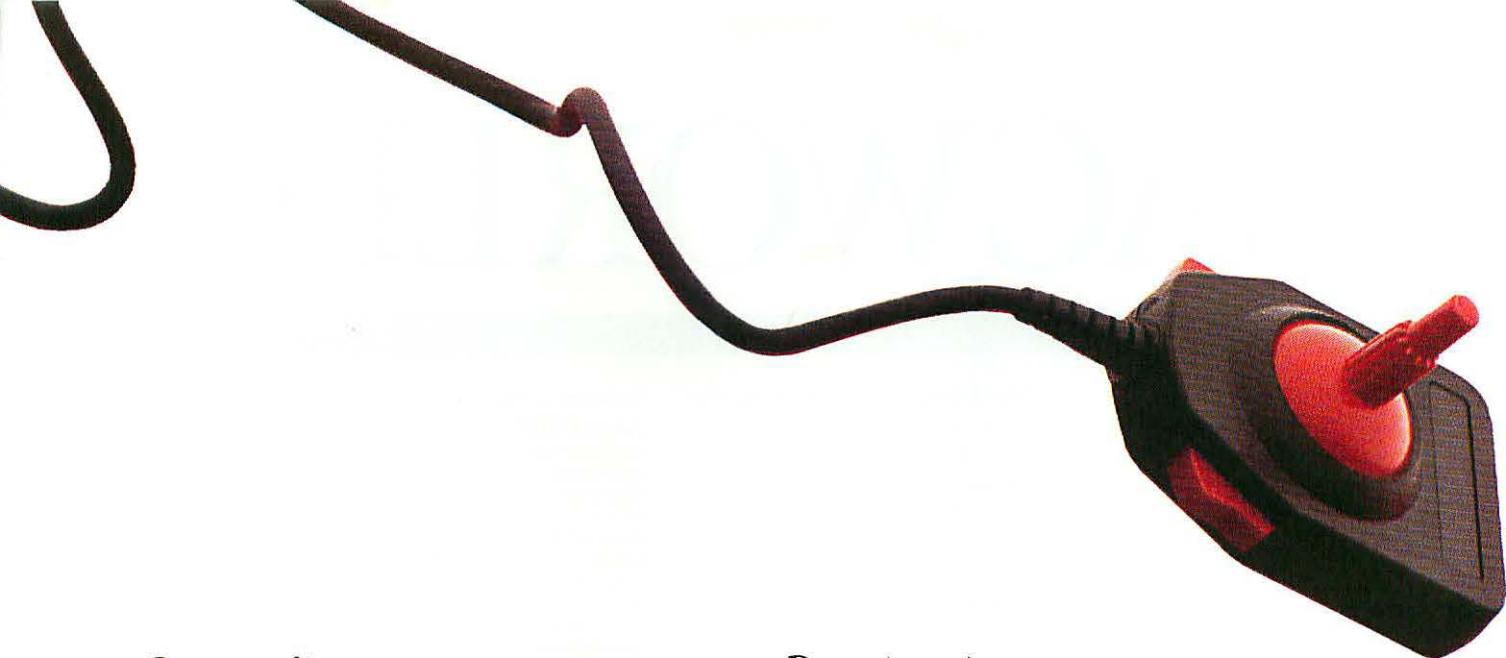
Matthew Zeidenberg

Short programs in Macintosh Pascal generate fractals, approximating the infinite detail in natural objects.



The Mac finds a voice in SmoothTalker, one of five products reviewed in Macware Reviews, a department that debuts this month on page 143.





Community

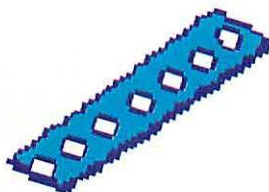
- 134 A Physicist, a Mac, and a Death Star**
Robert Buderl
The puzzle of periodic mass extinctions might be solved if physicist Richard Muller meets his Nemesis, a hypothetical companion star to the sun whose orbit has been simulated on the Mac.

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David Bunnell
- 25 Letters**
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Hard disk times and other news and notes for the Macintosh community.
- 55 Get Info**
Lon Poole
Macworld's tutor answers questions about Pascal, printers, and numeric keypads.

Photo/illustration credits

David Bishop, cover, 80-81, 88-89; *John Hersey*, 44, 94-95; *Robert Holmgren*, 42, 45; *Ed Kasbi*, 135; *Jeffery Newbury*, 116-117; *Roger Ressmeyer/Wheeler Pictures*, 137; *George Steinmetz*, 13, 55; *Fred Stimson*, 108-115; *Rudy VanderLans*, 41, 43; *Mick Wiggins*, 143, 145, 155.



Departments

- 143 Macware Reviews**
Edited by Erfert Nielson
Short but straight-shooting assessments of *Electric Checkbook*, *Home Accountant*, *Lode Runner*, *Millionaire*, and *SmoothTalker*.
- 167 Open Window**
Edited by Jim Heid
An exchange of Macintosh discoveries, including the results of a BASIC battle.
- 187 Macworld Gallery**
Edited by Erfert Nielson
An exhibition of Macintosh graphics, including works by children under five years old.

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MACWORLD

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August 1985

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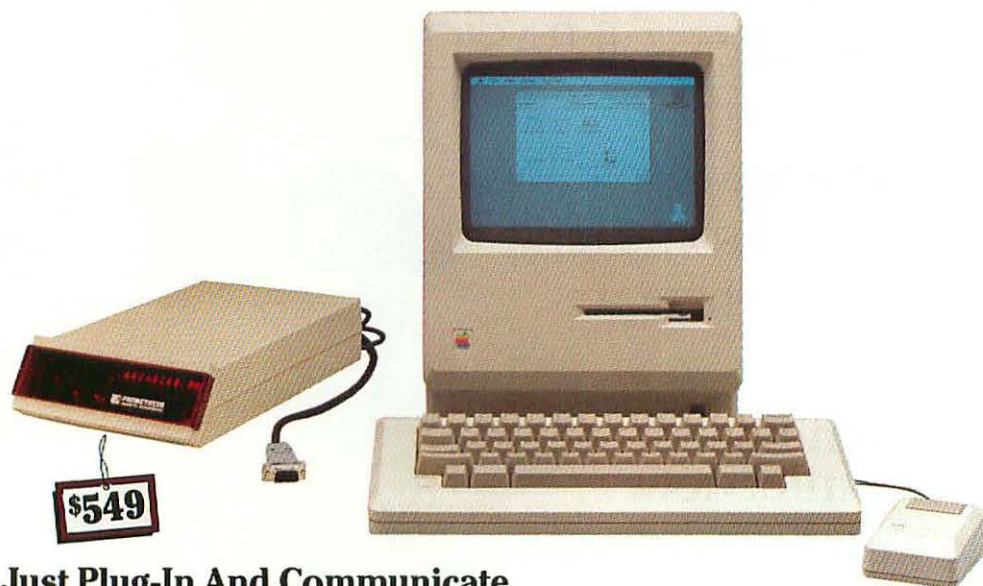
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The Macintosh... **HOT-LINE**

The Expandable Macintosh Modem With Software And Cable

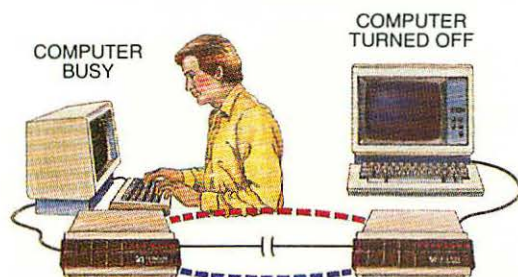


Just Plug-In And Communicate

If you're a Macintosh user, you need our expandable 1200/300 baud intelligent modem. Supplied with our ProCom-M communications software and "Mac-to-modem" cable, ProModem 1200M is so simple to use that you'll instantly be on-line and communicating. It's Hayes compatible, and the price is right, too. Just \$549 complete.

Electronic Mail A Reality

ProModem 1200M gives you something that's not available on any other modem in this price range. Our \$99 Communications Buffer and Alphanumeric Display options provide you with a sophisticated electronic mail network.



Amazing but true, your ProModem 1200M answers the phone, collects messages up to 50 pages long, sends out electronic mail, and displays all messages sent or received even though you are gone and MAC is busy or turned off. Thanks to ProModem 1200M, expensive hard-to-use communications software is not needed. The communications is in the modem, and electronic mail becomes a background function, where it belongs.

Communications Software

Our ProCom-M communications software is designed specifically for Macintosh. It's simple to use, and maintains all Macintosh user interfaces such as icons, pull down menus, full windowing, dialog boxes and mouse control of all commands. You can initiate complex dialing sequences with two clicks of the mouse. ProCom-M includes X-modem protocol for error-free communications with any personal computer. This powerful software does a lot, but is so simple that most users will hardly have to refer to the manual.



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But we can't write everything.

So when we find something really excellent out there, we publish it.

Every program has to sweat out an interview.

Because we've begun to build up an impressive body of Macintosh work, we founded Microsoft MacLibrary™ programs to house them.

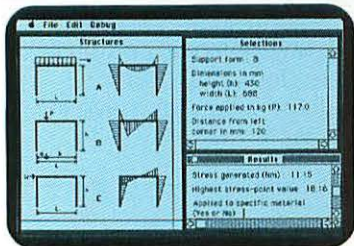
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And these disks can't just roll in off the street. Each program has been exhaustively reviewed, previewed, and scrutinized.

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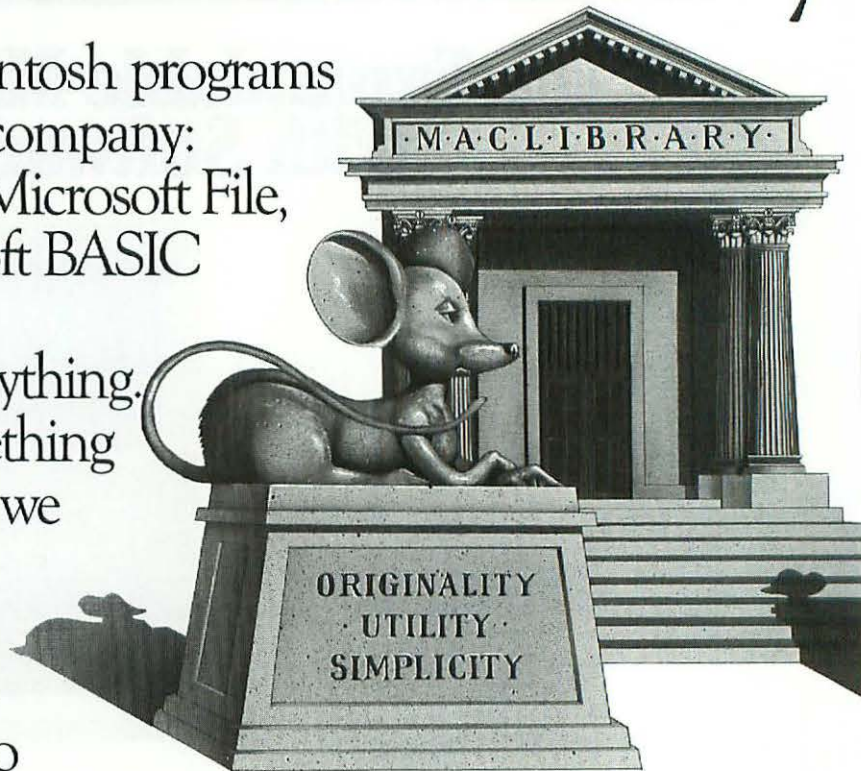
Our first releases.

The renowned programming language, Logo, has now come to Macintosh. A mainstay of university curriculums,



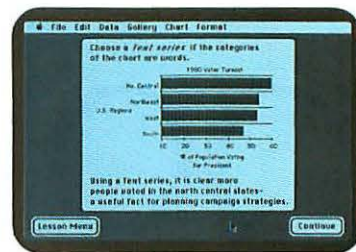
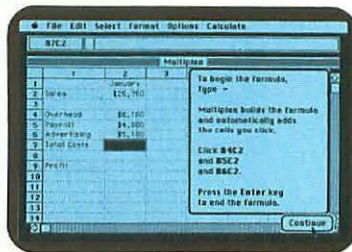
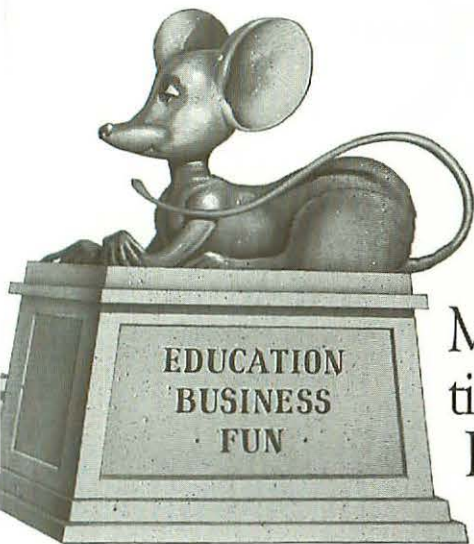
Logo by Logo
Computer Systems Inc.

Logo teaches programming concepts, techniques, and problem solving strategies. And it makes it all fun to boot. Intriguing enough to challenge even an advanced programmer—or motivate a child—this is Logo's latest



dedicated to Macintosh.™

generation. And it takes full advantage of all of Mac's easy to use features.



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Now data do look base.



The Spokesman

Effective January, 1985

Item Number	Product Description	Price
AC 2345	Water Bottle	15.00
AB26L	Ladies 26" Breeze 10 Speed	179.00
AB200	Bicycle Built For Two	249.00
AB100		69.00
AB27M		
HT100		
FCA911		
FCA901		
5792		
5796		
5650		
BBS200		
BBA101		
BBA102		
27AW		
26AW		
SB 231		



The Spokesman

12 Bearing Street Wheeling, W.VA 26055
March 6, 1985

Jeremy Williamson, Jr.
1456 East Raybourne Road
Farmville VA 23944

Dear Jeremy:

Thank you for your recent order from the Spokesman Company. We are currently processing your order for immediate shipment. The following list represents the totals we have received in our shipping department.

2	27" alloy wheel	# 27AW	at	\$62.00	\$124.00
1	Seat Post	# 5792	at	\$22.78	\$22.78
4	Brake Shoes	# BBS200	at	\$3.00	\$12.00
2	Saddle Bags	# SB 231	at	\$38.00	\$76.00
Total Order:				\$234.78	

I am confident products for you free number if modify the or telephone price adequate notice

Thank you again in the

Sincerely,

John L. Sp



The Spokesman

PURCHASE ORDER

To: Weinmann, USA
88 Skid Row
New York, NY, 01103

Description	Item Number	Units	Unit Price	Extended Price
Brake shoes	BBS200	2	\$0.50	\$1.00
Brake lever, right front tire	BBA101	1	\$5.45	\$5.45
Brake lever, left front	BBA102	2	\$5.45	\$10.90

Amount of Purchase order: \$17.35
Sales Tax: \$1.12
Total Amount of Purchase order: \$18.47



The Spokesman

STOCK BOOK

Description	Handlebar Tape
Item Number	HT100
Opening	20
Last Inventory Date	January 10, 1985
Reorder Point	8
Vendor	MiracleTape Inc.
Vendor Address	66 Tacky Drive Stickyville, MA 01701
Closing Stock	10
Current Inventory Date	March 31, 1985
Understocked by	-2
Comments	Available in brown, red

To: Acme Water Bottle Sales
2389 E. Salem Drive
Kiokuck, Iowa 23668

To: American Bicycle
234 Main Street
Philadelphia, PA 03456

To: MiracleTape Inc.



The Spokesman

Vendor	Description	Item Number	Closing Stock	Under-Stocked
Acme Water Bottle	Water Bottle	AC 2345	8	4
American Bicycle	Ladies 26" Breeze	AB26L	3	-1
American Bicycle	Bicycle Built For Two	AB200	4	8
American Bicycle	Solo Unicycle	AB100	5	1
American Bicycle	Mens 27" Blazer	AB27M	3	1
Totals for American Bicycle			15	9
MiracleTape Inc.	Handlebar Tape	HT100	10	-2
Miyaka Bicycle	Chrome forks for 27"	FCA911	2	1
Miyaka Bicycle	Red Flyer Bike	FCA901	4	1
Totals for Miyaka Bicycle			6	2

Units in Stock	Reorder units	Total Restock Cost
49	20	\$1,330.81

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Introducing FileMaker.

Because just *having* information isn't enough. You have to be able to do whatever you want with it. Arrange it. Rearrange it. Massage it.

Embellish it. Make it into something you can use. Easily.

FileMaker™ lets you not only store and organize your business information, but manipulate it in limitless ways, to create literally any kind of form or report you want.

First of all, FileMaker lets you change direction, any time, without redoing everything. It even lets you start out without a direction.

And in addition to doing all the meat-and-potatoes things a database is supposed to do—calculations, summary reports, sorting of all kinds—FileMaker does everything you bought your Macintosh™ for. Text editing. Graphics. Pull-down menus. Keyboard commands. Windows. Different fonts, styles and graphic design tools. Your information not only makes more sense, it makes an impression. Any kind you want.

With FileMaker, you can even design your own data entry forms, so

you can put information in any way you want, without arbitrary limitations. And of course, it does all the tricky little things automatically... like indexing every word, number and date for speed searches.

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So what might have been a dreary order acknowledgement can now be a clear, friendly letter. Or it can be a meaningful comparison of inventory by vendor. Or parts lists, receiving verifications, purchase orders, labels, name badges, rosters and hit lists.

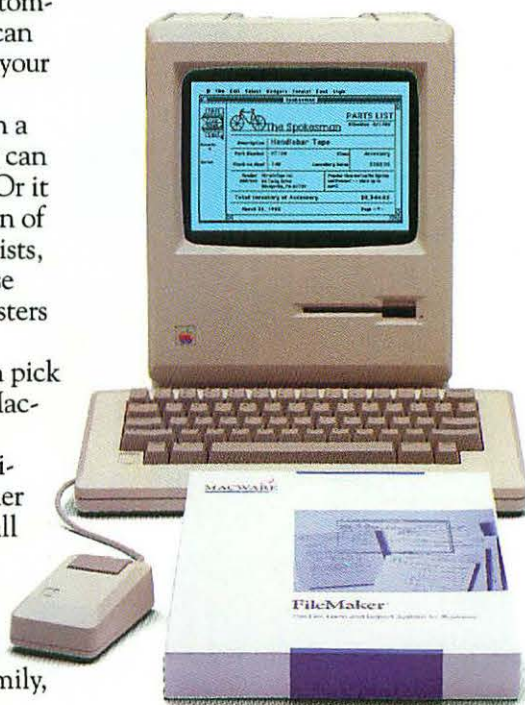
With FileMaker, you can pick up from other programs, like MacWrite™, MacPaint™, MicroSoft Plan™, Jazz™, and share the applications you've created with other members of your team. You get all the tools you need to easily consolidate group efforts into one database.

And FileMaker takes full advantage of the Macintosh family, including the Macintosh XL™, Macintosh Office™ and LaserWriter™.

So for \$195 (suggested retail), things could look considerably better for your entire division, department,

professional practice, retail operation, club, organization, or principality.

Contact your Macintosh software dealer for a demonstration, or call 1 800 MACWARE to find out where you can get FileMaker in your area. From Forethought, Inc.



MACWARE™

The Intelligent Choice Made Simple!

You want to make the intelligent choice, but, whether you're in baseballs or ballistics, choosing the right accounting program for your business was a difficult task.

Meet MACCOUNTANT™

Like the Macintosh™ it was specifically designed for, MACCOUNTANT proves that simple doesn't mean simple minded. It's a ferocious number cruncher that's been civilized so MACCOUNTANT works for you, not against you.

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Not just another pea in the pod!

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And MacBase works like a MacintoshTM database should... as easy to use as MacWriteTM and MacPaintTM.

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*There's no need to learn a special database language. And here's the best part... it's competitively priced.**



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EQTRON

For information or the nearest dealer contact
Eqtron Corporation

Telephone 1-800-MacBase

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- Full double entry system. You cannot go out of balance.
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- Comparisons with budget and prior year performance. By period and year-to-date.
- Multiplan™ transfer. Extract data for spreadsheet programs and other forecasting systems.
- 400 accounts on one 400K disc.

Retail price: \$145

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Keep track of who owes you what from how long ago. Print reports or display them on the screen. Either way you've got solid control of your business with features like these:

- Up to 9,999 customers.
- Full three-period aging. You define the periods.
- Open-item or balance-forward accounts or both. Your choice.
- Sales analysis by customer, salesperson, branch, type of sale, product, or just about anything else you can think up. 999 ways to analyze your sales for the period and year-to-date. Pinpoint your problems and your opportunities.
- Compatible output to the Financial Series General Ledger. Analyze profits as well as sales.
- 300 accounts on one 400K disk.

Retail price: \$145

Inventory Control

The perfect system for your retail or wholesale business.

- Handles all these transactions: purchase orders, receipts, transfers, adjustments, issues and returns.
- Provides complete audit trails.

- Tracks stock by units and dollars: How many dollars you have on order. The dollar value of your inventory, sale prices, and profit margins.
- Controls stock levels. Reorder Report shows quantities below your specified minimums.
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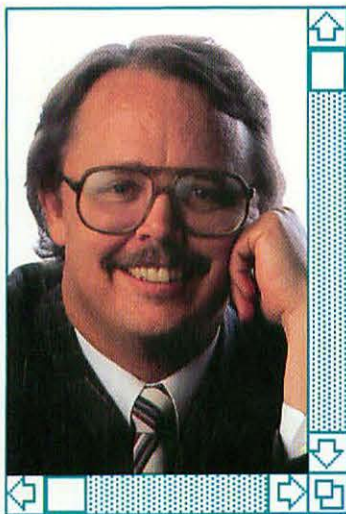


PALANTIR
SOFTWARE

*Requires Microsoft Basic

Mutiny on the Bounty

Apple jettisons its captain and sets sail on a course without wind



I was flabbergasted when I learned that Steve Jobs had been removed as leader of the Macintosh group inside Apple.

Steve is the most important person in personal computing, and his involvement was absolutely key to the Mac's success. Without Steve no one would have been able to challenge the monolithic IBM Personal Computer standard and create a radically more advanced computer.

No question, the beauty of Macintosh is the result of the collective love and sweat of many driven, creative people: Jef Raskin, who conceived the Mac; Burrell Smith, who designed its electronics; Andy Hertzfeld, who wrote much of its software; Mike Murray and his staff, who got the message out; and many others.

But Steve played the role of genius innovator, inquisitor, cheerleader, and facilitator. He instilled a sense of grand importance and inspired downright fanaticism in the Mac team.

Like many geniuses, Steve has his dark side. His sarcastic tongue can be as sharp as a scalpel or as destructive as a hand grenade.

Stories of Steve's tirades and his brutally honest comments abound in Silicon Valley. But funny stories about Steve abound too, and he is undoubtedly a public figure whose personal life is subject to the public's watchful eye. Everyone who has ever said "Hi" to him likes to think that he's a friend.

Steve's major flaw is that he demands too much of himself. He has an intense knowledge of topics outside computers, such as art and architecture. And he is just as opinionated about those subjects as he is about computers.

Understandably, as a highly motivated person with strong opinions, he sometimes overlooks other points of view.

In the early days of the Macintosh project, Steve told the Mac group that they were corporate pirates; they even hoisted above the Mac building a black flag with white skull and crossbones.

If they were the pirates, then the rest of Apple was the Navy. And guess what? The Navy won.

The Navy (Apple II division) was feeling pretty downtrodden and ignored. Here they were contributing 80 percent of Apple's revenue, and they were forced to watch the stockholders meeting on closed-circuit TV while the Mac team got front-row seats.

Now the Navy is back on top and can get its revenge.

I hope the Navy, having hung Jobs and Macintosh marketing director Mike Murray from the mast, will sober up and show some restraint. Otherwise Apple will be the Coleco of 1985.

Mike Murray once asked me what I thought Apple should do about the Apple II. I recited the high-tech adage: If you don't make your own product obsolete, someone else will do it for you.

Let's be honest; the Apple II is a dog. I hated it back in 1979 when I had a job that required I use it. It was slow and had limited RAM and disk storage space and terrible screen resolution. At least 20 other personal computers on the market at that time were significantly better.

The early Apple II required a costly additional circuit board just so it could display lower-case characters. I have often thought that if Steve Wozniak is such a genius, how come he didn't realize that word processing would be one of the leading applications for personal computers? Or did he think we'd all become technoids and convert to writing everything in ALL CAPS?

(continued from page 16)

Which is the better way to



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3	1	ROGER ACRES	6	15	503	PATCH KEY	40.0	25.7	15.4
4	2	TON BLAKE	3	15	501	HOT FELT	88.3	68.3	7.7
5	2	TON BLAKE	3	15	502	ACRYLIC	27.0	42.6	3.2
6	2	TON BLAKE	3	15	505	PATCH KEY	21.1	33.3	3.3
7	2	TON BLAKE	3	15	504	AEROPAGE	7.0	9.9	1.2
8	2	TON BLAKE	3	15	506	PASTE	11.1	6.6	5.5
9	3	THOMAS CARROLL	11	30	501	HOT FELT	66.3	54.2	7.7

With an ordinary data manager, you have to re-enter existing information every time you enter new information. Pretty inefficient.

```

      *****ENTER VALUES*****
      Add      Delete      New      Previous      First      Last      Quit

      SALESMAN'S SALES STATISTICS

      SALESMAN NO:   2

      NAME:  TOM BURKE
      AREA:   3
      LINE:  5

      FROM PRODUCT   JAN      FEB      MAR      APR      MAY      JUNE      TOTAL
      161  HOT ROLL    25.0  28.3  37.7  58.5  64.0  43.4  267.9
      502  KROMFLIP    39.0  22.4  22.4  53.2  32.2  47.8  216.0
      523  PATCH KIT   21.1  39.3  33.0  19.7  21.1  58.0  182.0
      504  REBURPINE    7.6  8.5  12.3  9.8  10.5  15.0  63.7
      505  PASTE       1.1  4.8  9.3  32.0  0.0  0.0  47.2
      -----
      154.5  130.6  141.0  142.3  126.1  102.6  677.2
  
```

With MacLion, you only have to enter the new data that has changed. Not only that, you can design your own data entry screens. Now, which is the most efficient way to manage your business data?

The problem?

Well, if you have a sales order entry file, every time you enter new data about a customer's order, you also have to re-enter all the existing data about your customer.

Repeat, repeat, repeat.

Worse, if you ever want to move the data from your sales order entry file to develop a new file, without having to rework it all over again, there's one small problem.

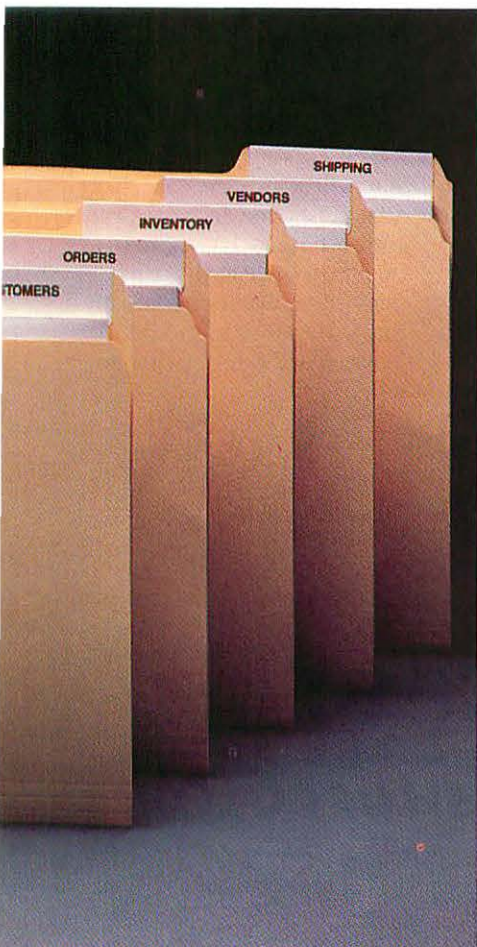
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In a sales order entry system, one relation contains biographical data about your customers that doesn't change. Another has their order data that does.

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So when it's time to update customer orders, you only have to enter in new data. Not re-enter what already exists. And you can develop

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Macintosh users.

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In a recent interview, the GREAT WOZ declared personal computers boring and useless. Comparing them to model trains, he said they were mostly for hobbyists and that all the hobbyists who wanted one already had one.

If that is what Woz really thinks, then he's turned into the Billy Carter of high tech. Perhaps now they've gotten Jobs out of the way, the Navy can bring its mascot back.

The new Atari 512K ST Mac-alike, with its great color graphics, will be out this Christmas and will sell for about the price of the Apple II. It will have at least as much software as the Mac had when it was introduced, and it will have the ad-

vantage of an optional compact disk (CD) interface. This machine and a similar one from Commodore will knock Apple out of the home market unless the Navy gets smart and produces a low-cost Macintosh color graphics machine itself.

Because of its massive software base, the Apple II will survive another year or two in the educational market. Meanwhile, the Mac, probably in spite of the Navy, will capture an increasingly larger share of the small business and independent professional markets, as well as specialized niches in large corporations.

Lotus's *Jazz*, which could eclipse Lotus 1-2-3 as the greatest piece of personal computer software yet, will fuel the Mac's growth. Millions of people who do not yet use computers will flock to the Mac rather than go to night school to learn the IBM standard.

Other great software, including Microsoft's *Excel*, will make the demand for the Mac exceed anything Steve Jobs ever imagined.

The personal computer market will likely be divided into four camps: the Atari ST or the Commodore Amiga in the home computer market, the Apple II and its successors in education, the Mac in small business and specialized markets, and the IBM PC and its clones in large corporations.

The only question is whether Apple will get stuck with a huge inventory of immovable computers, as did Texas Instruments with the TI/99, as did IBM with the PCjr, as did Col-eco with Adam.

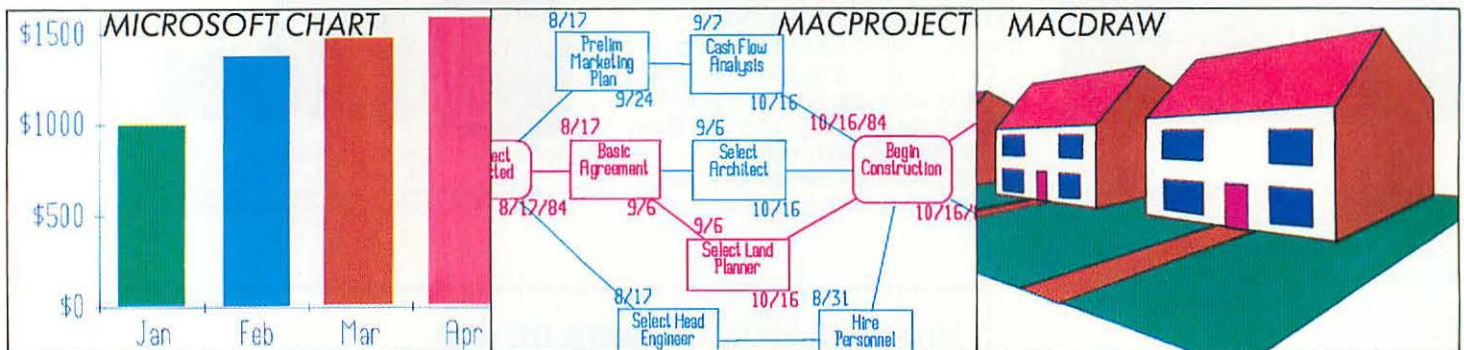
So the moral of the story is that the story isn't over. The man from Pepsi has no excuses—no Steve to blame for his problems.

The Apple II will die and the Mac will soar. Steve Jobs, like Adam Osborne and many other entrepreneurs, has more than one life to give to his company—or to another company if that's the way it has to be.

Steve will be back—just wait a while. □

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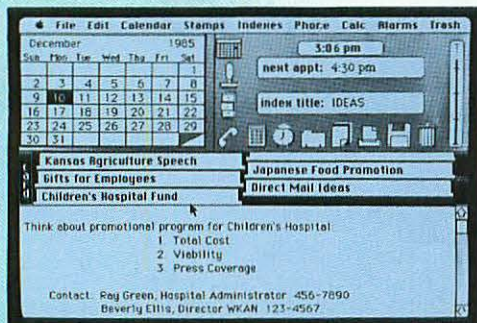
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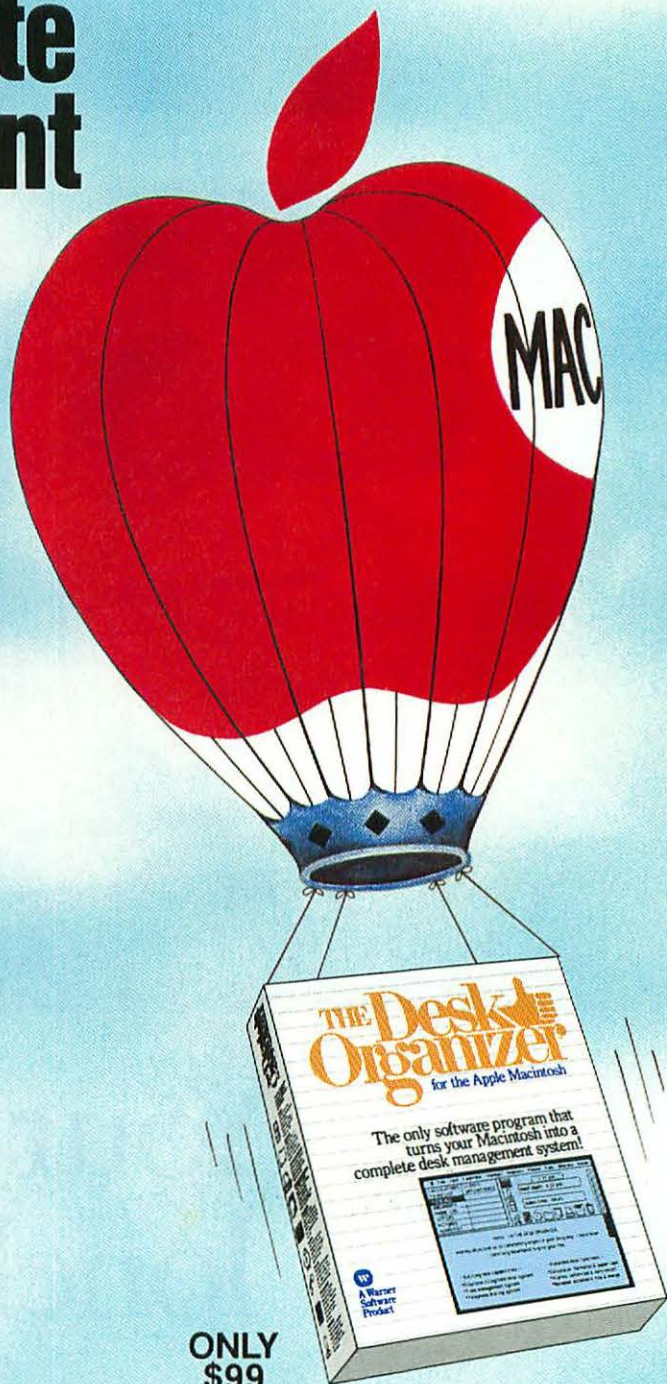
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Connects to your MAC via the modem or printer port. Printer connector and integral print spooler provided on MAC-10.

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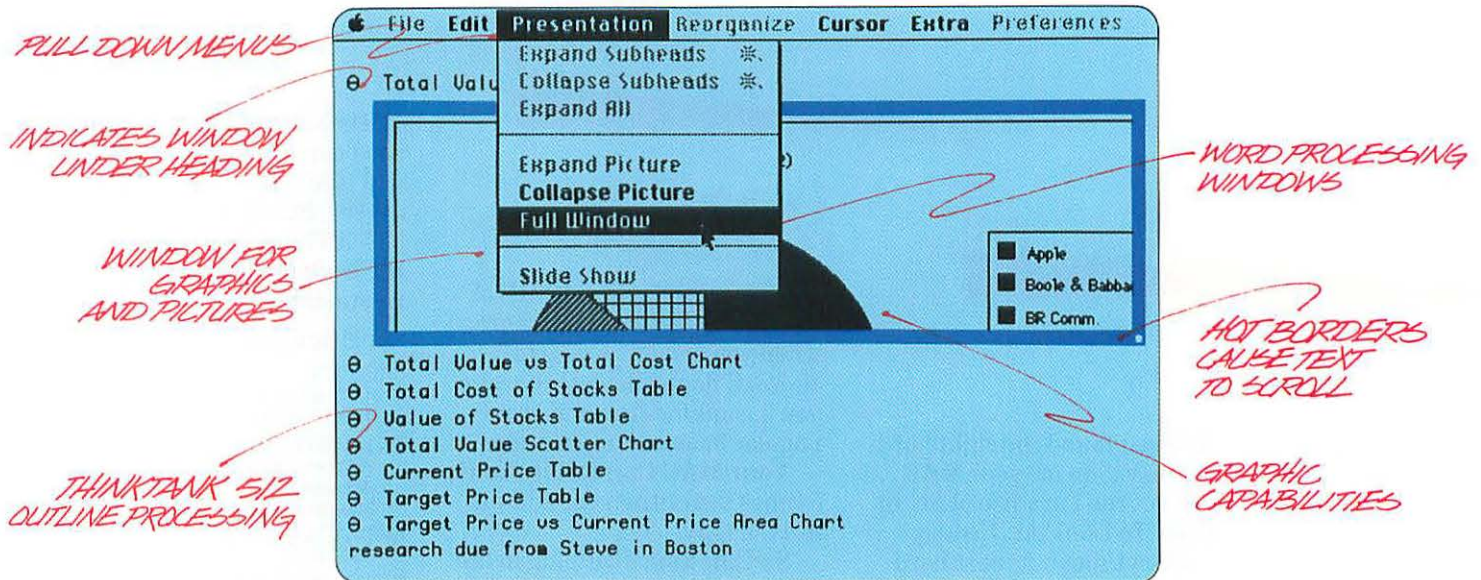
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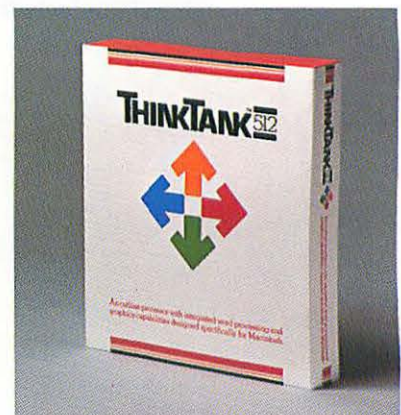
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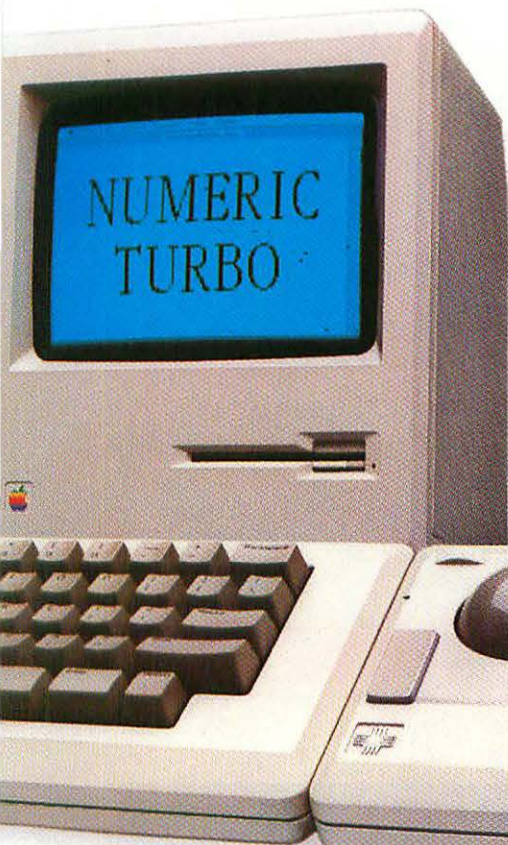
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The action packed game.

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Look out, the transport plane just air-dropped a tank. Back to the anti-aircraft gun. A tank that makes it down to the ground shoots with deadly accuracy. And then... the jets come screaming in like banshees. Their air-to-ground missiles don't miss!

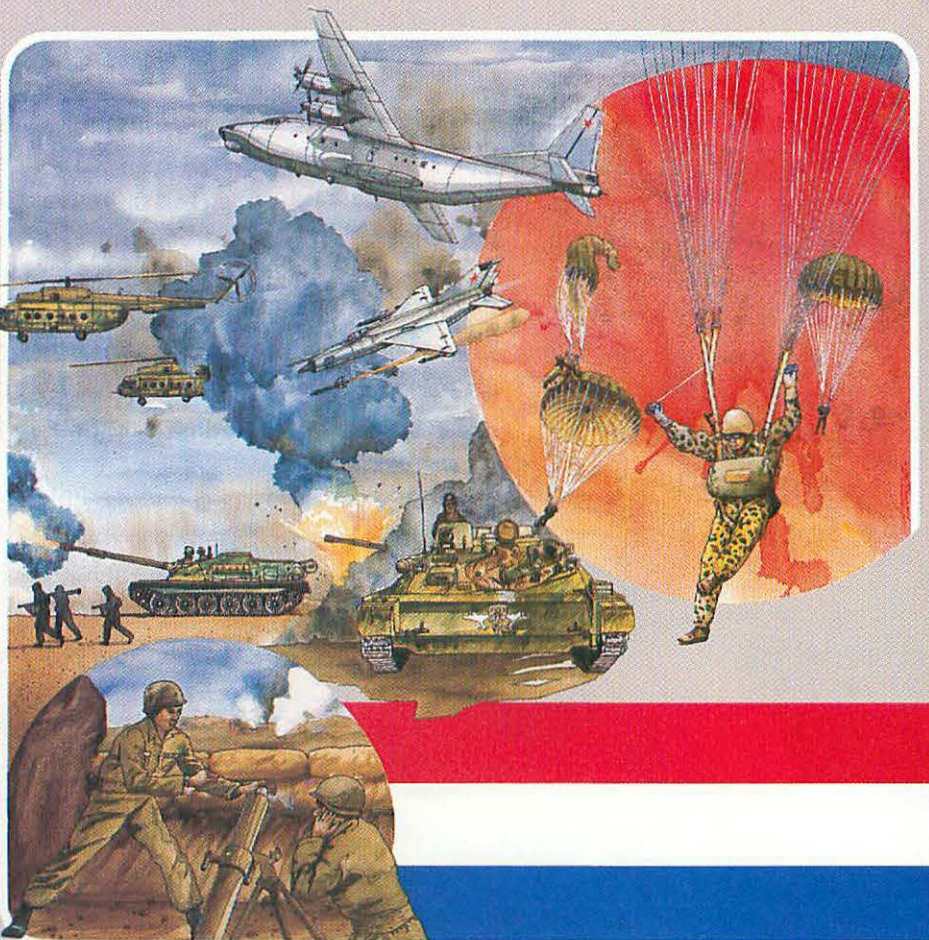
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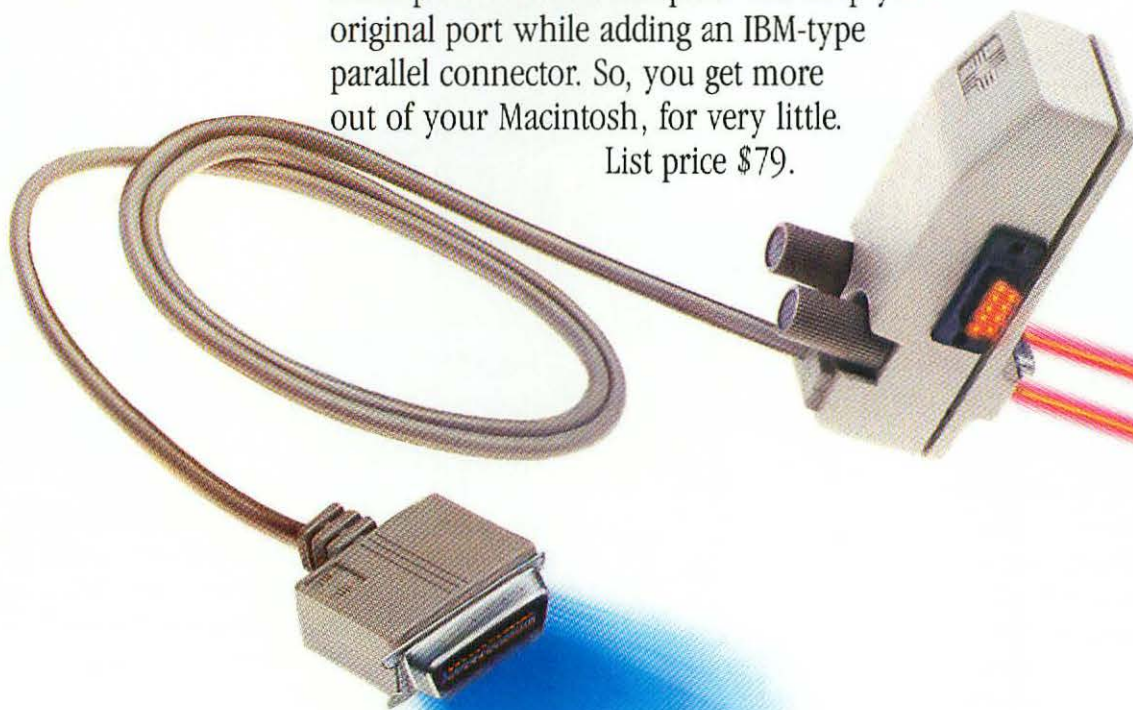
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Letters

Vintage Whine

OK, I will renew my subscription. However, may I make a suggestion, since I pay part of the bills around here? I don't know how all your readers feel, but a large number of subscribers with whom I have talked are tired of the anti-Mac bias in your editorials. For example, "The Inconvenience of Convenience" [*Macworld*, April 1985] is just about the last straw. If I want to read about how terrible the Macintosh is, I can easily find other journals that describe how infinitely superior other equipment is. If you truly wish to be the "reader-friendly publication for Mackers," then knock off the Macintosh criticisms.

Anyone who uses a Macintosh for more than a few days realizes that it's not perfect. I choose to use the machine because even with its shortcomings it is still the best computer for my purposes. So stop whining about things that may have no relevance to anyone besides yourself. It's OK to dislike facets of the machine. It's quite another thing to write an editorial in an effort to convince others that the machine is fatally flawed.

I read *Macworld* because it offers me information that is hard to gain elsewhere and informs me about new products

for the Mac. I do not read it in order to hear the nth version of why the Macintosh should be redesigned. The bottom line: your magazine is good. It provides a valuable service to me. The negative Macintosh propaganda has no place in a Macintosh magazine.

Bryan Johnson
San Jose, California

Slow Disk at Work

In "The Inconvenience of Convenience," [*Macworld*, April 1985] Adrian Mello correctly identifies the painfully slow response of the Macintosh to common operations (like quitting and returning to the Finder) as a major problem. But the Mac's lethargy has little to do with the complexity of its desktop interface. The reason is much simpler—the disk drives are miserably slow.

Run any application on a Mac with a HyperDrive or a RAM disk, and the problems suddenly vanish. It is unfortunate that complicated software fixes will be devised to get around a simple problem that plagues all Apple computers—inadequate disk access speed. Apple should worry less about the el-

egance of its operating systems and more about getting the basic hardware and low-level software right.

Mark S. Jennings
Durham, North Carolina

While the Mac's floppy disk drives are partly responsible for its unburied pace, version 1.1g of the Finder makes too many trips to disk when building the desktop. This disk access has been minimized in Finder version 4.1. Comparing the new Finder's performance with that of the earlier version would be more valid than comparing disk drive speeds because floppy disk drives are inherently slower than hard disk drives or RAM disks.—Adrian Mello

Child's Play

My name is Amy. I am 12 years old. Several months ago you published a program, named *Mouse-Ball* ["The Mouse Will Play," *Macworld*, September/October 1984]. My father put that program on our game disk. On March 8, a Friday, I maneuvered the ball to hit the apples in a certain pattern so it would just hit the apples, row after row. The game played on for an estimated 7 hours. The final score was 32,767 points—as high as it would go.

Amy Kuniyoshi
San Francisco, California

Short Flight

Being an owner of a 128K Mac, I can assure David Bunnell most wholeheartedly that a 512K Mac is not a requirement for enjoying *Airborne!* ["A Mac Awakening," *Macworld*, May 1985]. I play *Airborne!* constantly on my Mac. In fact, the only difference that I have been able to discern—mention is made of this on *Airborne!*'s help menu—is that the opening song plays for a shorter time on a 128K Mac than on a 512K Mac (8 seconds instead of 20).

Laurie Rich
Redwood City, California

Problem Solver

Although "The Larger Equation" [*Macworld*, May 1985] did a good job of discussing the capabilities and limitations of *TK!Solver*, it failed to address the major deficiency of this software, that is, its inability to electronically transfer tabular data to other programs such as *Chart* and *BASIC*. The program allows only plot figures to be selected and copied to the Clipboard. Obviously, the data listed in the table is more important. The program should have the capability to select all or part of this data for transfer to other programs. As it is, if I

Maccessories. 16 ways to improve the performance of your Macintosh.™

Maccessories from Kensington Microware—an entire family of products to enhance your Macintosh. Maccessories make your computer more convenient. They increase your system's flexibility. And they protect your investment.

1 Control Center



Organizes all your power needs. Styled to fit underneath your second disk drive, it provides fingertip control over your whole system. There's a master switch to power the whole system on and off, and individual switches for a printer, modem and one auxiliary device. And Control Center protects your entire Macintosh system from damaging power surges, line noise and static shocks.

2 Surge Suppressor



Portable protection for a travelling Macintosh. Surge Suppressor replaces your power cord, providing UL listed surge suppression and line noise filtering. It's light and fits easily into your carrying case.

3 Universal Printer Stand



Raises your Apple® Imagewriter® at a slight angle so you can monitor its performance more easily. It solves the problem of where to store paper—several hundred sheets are accommodated neatly underneath. (Also fits most other dot matrix printers.)

4 A-B Box



If you want to take advantage of the AppleTalk™ network, a LaserWriter™ printer or a hard disk in addition to your Imagewriter and modem, you'll have three peripherals competing for the two serial ports on your Macintosh. The A-B Box gives you the extra serial port you need. Just plug two of your peripherals into the A-B Box and plug the Box into one of your Macintosh serial ports. Then simply divert your data output to the peripheral of your choice—press A to send to one, B to the other. Fits perfectly underneath your external disk drive.

5 Tilt/Swivel



Gives you the flexibility to tilt and swivel your Macintosh to the viewing angle most convenient for you.

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Provides safe storage for 36 Macintosh disks. Comes with a packet of spare disk labels. Also includes a handy Disk Pocket for safe transportation of up to 5 disks.

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Protect your system from the elements. Anti-static dust covers for Macintosh, Macintosh XL, Image Writer and External Disk Drive.

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A safe, clean place to keep your Mouse when not in use. Attaches to the side of your Macintosh. Fits under the Maccessories Dust Cover.

10 Mouse Cleaning Kit



A full year's supply of the cleaning materials you'll need to keep your mouse rolling at top speed. Also includes the Mouse Pocket.

11 Disk Drive Cleaning Kit

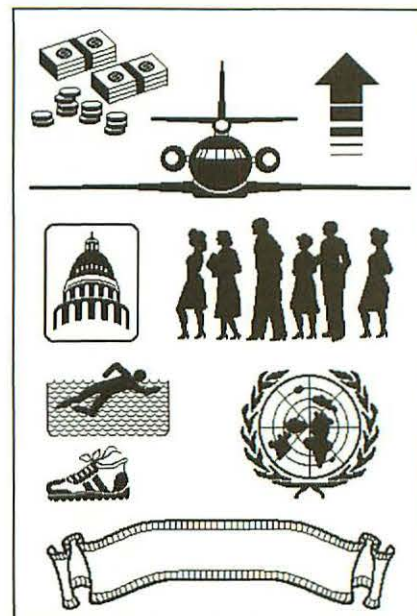


A full year's supply of the cleaning materials you'll need to keep your drives running smoothly.

12 Graphic Accents

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Circle 11 on reader service card



13 Professional Type Fonts

Styled after the most popular type faces in the publishing industry. Type Fonts for Text contains 16 fonts in sizes 12 to 24 point. Type Fonts For Headlines (for the 512K Mac) contains the same fonts in sizes 24 to 72 point. Including versions of Times Roman, Helvetica, Optima, Futura, and a dozen others.

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want to produce high-quality graphs, I must print the data and type each entry into *Chart*.

I also question why *TK!Solver* allows you to save a table. Once a table is saved, what good is it? You cannot manipulate it without the program, and therefore it has little or no value. Perhaps Software Arts should delete this capability and substitute the ability to copy tabular data to the Clipboard.

Overall, I am very pleased with the equation-solving capability of *TK!Solver*. With the improvement in data selection, this tool would be highly recommended for business, academic, and scientific applications.

Ronald J. Basso
Seminole, Florida

The Last Pioneer

To those who ran out and bought the latest in technology and didn't ponder the age-old law of supply and demand, I say, "Thanks very much!" You are the people who made it possible for people like me to get better prices on the same technology. Had you demonstrated a modicum of patience, you might feel better about your Mac than you do.

Before you get out the rope and come after me, I offer you perturbed "pioneers" some consolation. What if you had purchased the IBM PC when it first came out? How would you like to have paid premium buckolas for ten-year-old technology? You at least had the good sense to purchase a state-of-the-art personal computer that is far and away the best that money can buy.

Paul Crooks
St. Paul, Minnesota

Mac Is a Camera

I very much enjoyed "Pictures to Pixels" [*Macworld*, April 1985]. I recently purchased a ThunderScan digitizer and really enjoy it. The article was very helpful and made me even more satisfied with the digitizer I bought.

Bobby Truelove
Lewisburg, Tennessee

Lost in the Alps

I bought a Macintosh here in Switzerland some weeks ago and must tell you that I feel like I'm in MacDesert. I don't know of any other Mac user, and I have not been able to get hold of Mac publications other than official Apple literature in German, some manuals with data I already know, a couple of photocopied price lists, and of course *Macworld*, which makes a big difference. Reading it confirmed that I made the right decision in buying the Mac, but it also made clear that

I get only 20 percent out of my Mac here in MacDesert, since I'm unable to exchange information and encouragement with others.

I want to encourage any Swiss Mac user who wants to change this desert into MacParadise to contact me. I am no computer freak, but I like my Mac and would like to meet others who feel the same way.

Christoph Pfluger
Worb, Switzerland

Minute Waltz

I am sick of reading about how busy people sit around and watch the wristwatch icon on their Mac screen. If their work load is so light that they can't find something to do for 60 seconds, then the last thing they need is a computer.

Bob Deeds
Villa Park, Illinois

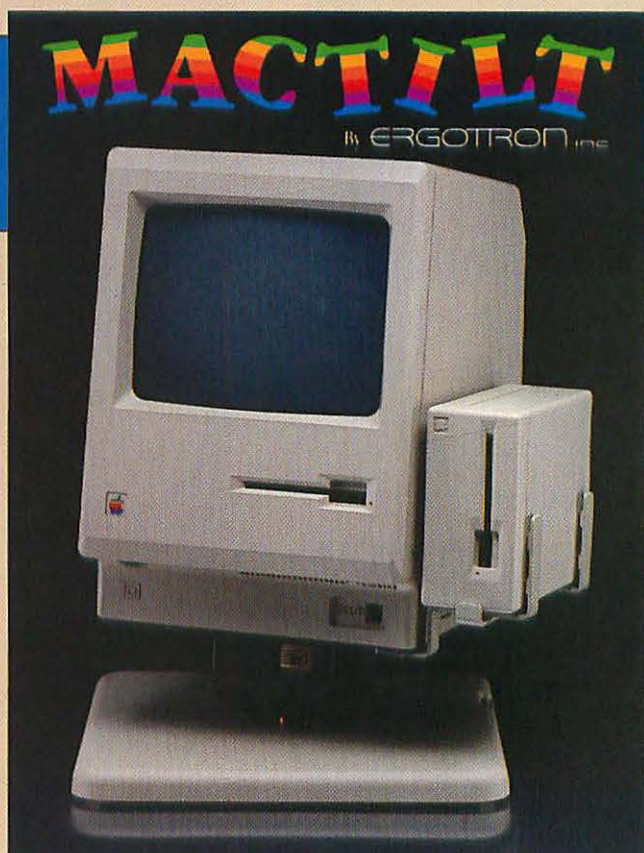
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Ergotron's new MacTilt[™] is the professional ergonomic workstation that provides the utmost in operator flexibility and viewing comfort. With a silky-smooth, one hand motion, your Macintosh can be adjusted to relieve operator stress, ease neck, back and eye strain, and increase productivity. A special bracket is provided to mount your external disk drive providing additional convenience and savings in desk space. The MacTilt by Ergotron[®] elevates the Macintosh approximately 4", and provides 30° tilt/360° rotation at the touch of a finger for only \$99.95. If you would like to receive more information on this exciting new product visit your Apple Computer Dealer or contact Ergotron at (800) 328-9839.

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Amazing
what goes
into
Macintosh
these days.

IBM PC software, for instance.

Macintosh and IBM PC software. Compatible at last, thanks to MacCharlie, a rather innovative coprocessing system.

And imagine the consequences.

Nearly 10,000 IBM PC software programs designed for general business and specific applications in real estate, insurance, law, medicine, banking, etcetera, can now join forces with Macintosh's own popular programs.

And, the myriad of IBM PC-compatible software adopts Macintosh's many beloved features, including desktop

utilities such as the clipboard and the calculator.

In addition, MacCharlie allows IBM PC and Macintosh data files to be exchanged. Talk about flexibility.

But the good news gets better.

You see, MacCharlie delivers hardware compatibility, as well. For example, IBM letter-quality printers can be easily used with Macintosh.

Furthermore, MacCharlie

now allows Macintosh to perform virtually any networking an IBM PC can perform. Even to the extent of tying in with IBM mainframes.

In other words, your networking capability goes beyond the Apple family.



The Macintosh keyboard slides right into MacCharlie's keyboard. About as easy as slipping a letter in an envelope.



Macintosh sets snugly beside MacCharlie, on a custom-fit pedestal.



Once you plug in MacCharlie's power and keyboard cords, you're ready to enjoy a very happy marriage.

How does it happen? As easily as slipping on penny loafers.

In mere moments, MacCharlie combines the best features of the world's premier personal computers.

And despite the fact that it turns one computer into two, MacCharlie adds but a handful of

square inches to Macintosh's physique.

In short, one of life's most perplexing decisions—whether to buy a Macintosh or an IBM PC—can now be made with the greatest of ease.

Ask for MacCharlie at your local

computer store. Suggested retail price for the 256K single disk drive model is only \$1195, and just \$1895 for the 640K dual disk drive version.

For more information, call Operator 15 toll-free, 1-800-531-0600. (In Utah, call 801-531-0600.)

MacCharlie offers 256K RAM, with optional upgrade to 640K RAM, 360KB disk drive, and optional second disk drive.



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Circle 232 on reader service card

If They Only Knew

I read with amusement the letters from early Mac owners expressing their resentment about the high price they paid for their beloved computers. As an Apple II+ pioneer I purchased my 48K system in the late 1970s for a little under \$3000. If I had waited four years, I could have saved \$2000 for a much better IIe with 128K RAM.

I never wanted another computer until the Macintosh came along. When we can afford it, my family will buy a Mac for the going price, and I will be envious that the early Mac owners have had a year's head start.

Unlike automobiles, computers are going to get cheaper and faster. Five years from now they will be cheaper and faster still. You can't wait forever. The

Mac pioneers should be proud of the fact that they had the foresight and vision to recognize a real winner early on.

*Chuck Marler
Riverside, California*

No Place Like ROM

Being a proud owner of a Macintosh, I use it every day and brag to my friends about it. But one thing I don't like is that Apple brags about its ROM routines. Big deal. To be able to use them fully, I have to buy *Inside Macintosh* for—get this—\$150. What a rip-off. One of my friends owns an Apple II+, and with his manual he received

ROM routines and addresses, pin information, and schematics. The first issue of *Macworld* is the closest I've come to seeing anything that vaguely resembles schematics. Too bad Apple won't support Mac owners the way it does Apple II people. Perhaps the reason is that Steve Wozniak was not involved in the Mac, but I still would like a little more support than "Give us more money, and we'll give you what you want." Come on, Apple— it's our machine, we bought it, give us a break. Otherwise, I think it's a great machine.

*Timothy Jurik
Huntington Station,
New York*

*The "phone book" edition of
Inside Macintosh is available
for \$25.—Ed.*

Correction

An item on *HumanForms* in *Macware News* (Macworld, April 1985) contained inaccurate price and address information. The program is available for \$79.95 plus \$3.50 for shipping and handling from The Reference Corporation, 1133 Broadway #611, New York, NY 10010, 212/645-1200. Our apologies for any confusion that may have resulted.

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**One-thousand-one,
One-thousand-two...**



Two seconds isn't a very long time.



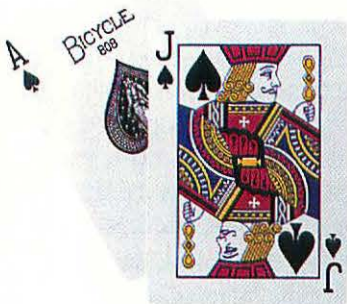
You could start your car.



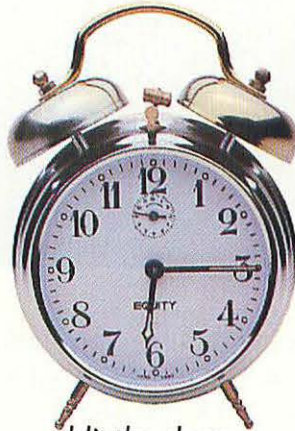
Pop a top.



Strum a chord.



Cut the cards.



Hit the alarm.



Pet your puppy.



Return a serve.



Pick a daisy.



Slip off a shoe.

Now, let us show you what we can do...

What can you do in two ticks of a clock?



Roll the dice.



Putt for par.



Flex a muscle.



Dunk a donut.



Catch a ray.



Snap a shot.



Lick a stamp.



Sip a Chablis.



Or bite an apple.

More Than a Database.

sequence of commands all by itself. Since a single Macro can contain hundreds of commands, the potential time savings are incredible.

OverVUE's Macro feature makes you the quarterback. Diagram the moves to run the way you want and from then on all you have to do is call the play.

Reports with Style.

Since the totally electronic office hasn't quite arrived yet, creating reports on paper is an important job for any database user. With OverVUE you can visually design custom reports in seconds by dragging fields into position with the mouse. What you see is what you get—for a perfect report every time.

After the fields are in position, you can type in extra information and titles. Use the headers and footers to include the date, time and page numbers. Crank out mailing labels one, two, three, even four up. And, unlike most other database programs, OverVUE can automatically print the city and state together so there's no unnecessary white space between them.

OverVUE provides room for eight different custom report templates with each database. When you've finished designing one, it's stored as an item in the Print Menu with its own name. So you have to design each report only once.

After you've designed a report, it can be printed out on either the ImageWriter™ or the LaserWriter™ in your MacOffice. You can change the font size and on the LaserWriter™ the report will automatically print sideways if it is too wide.

Getting the facts on paper has never been easier.

We're Clairvoyant.

Nobody likes to type. OverVUE can't eliminate typing, but OverVUE's *Clairvoyance* feature is a big help. Clairvoyance is great for fields that have repetitive data, like the description

column of a checkbook. Checks are often written to the same people over and over. When Clairvoyance is enabled, OverVUE will automatically finish entering the name once you have typed in enough to positively identify it. For instance, you might have to enter only "Paci" for Clairvoyance to realize that you mean Pacific Telephone.

Clairvoyance does more than just save keystrokes, it also helps insure that information gets entered the same way every time. So, US Widgets Inc. always gets entered precisely that way and not as US Widgets, United States Widgets Inc., or US Widget Company.

Of course Clairvoyance isn't OverVUE's only trick to make typing easier. OverVUE's *Input Pattern* automatically enters the slashes in a date, or the parentheses and dashes in a phone number. Or there's *Value Bar* when only a few entries are valid (such as True/False, or Red/Green/Blue).

OverVUE can't quite make data entry fun. But it comes close.

One-thousand-one, One-thousand-two.

You bought your Macintosh™ for clout. For the right facts, in the right order, at the right time. And that's exactly what you get with OverVUE.

OverVUE sorts, analyzes, categorizes, calculates, even charts. All in less time than it takes to say one-thousand-one, one-thousand-two.

In fact, OverVUE is the only database available for the Macintosh™ that waits for you instead of making you wait for it. So if you've got sales to analyze, inventory levels to track, customer lists to update, phone charges to allocate, time reporting to simplify, projects to schedule, bank statements to reconcile, employee records to maintain, accounts

receivable to monitor, or a power lust to satisfy, rush over to an authorized Apple® dealer for your copy of OverVUE.

You'll be amazed with what you can do with a Macintosh,™ OverVUE and a few ticks of the clock.



Suggested retail price is \$295.00.

Current owners—call for information concerning upgrades.

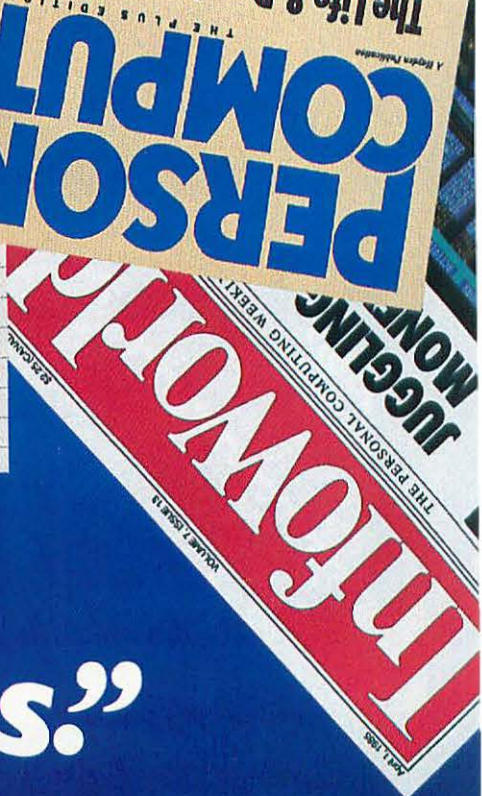
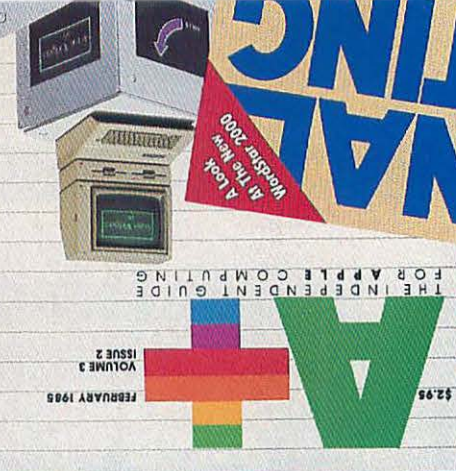


OverVUE™

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Documentation	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Ease of Use	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Error Handling	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Support	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

April 1, 1985: "OverVUE is rich in features that rank it with the more sophisticated databases available for the Macintosh... the more we worked with it, the more we came to respect OverVUE's power and capabilities, not to mention its speed."

According to **MACWORLD**, January, 1985: "OverVUE is a fascinating program. A cross between a data base manager and an electronic spreadsheet. ... Its ability to share data with Multiplan makes it a must for serious financial work."

A+, February, 1985 said: "OverVUE is Macintosh software the way it was meant to be. ... Speed Demon. ... geared especially for lightning fast performance. ... Extremely easy to master."

The report cards are in. And OverVUE has earned high marks among databases for its mind boggling speed, its incredible range of features and its amazing power. Now we could elaborate on these things ourselves. But we figure you'd rather hear it straight from the experts who make out the grades:

Reported **INFOWORLD**,

PERSONAL COMPUTING, February, 1985 wrote: "OverVUE can execute almost all of its commands in the blink of an eye, or two blinks at the most. ... Its speed and math capabilities go well beyond what most personal computer data base programs have achieved. ... it definitely can make the Mac you already have a much more useful tool."

Stated **CLUB MAC**, September, 1984: "I know of no other data base that can touch it. ... Lots of power here. No doubt about it, this is a sweet system. ... It sets a behavioral standard for programs in its class."

Praised **MACAZINE**, December, 1984: "It may be the best money you've ever spent. ... The amount of pure data analysis one can do with their files is mind boggling. ... This is the Macintosh at its best."

Well, there you have it. We could have filled up pages with quotes like these, but we think you get the picture. Obviously, we're not the only ones who think OverVUE is terrific. An enormous number of knowledgeable experts feel pretty much the same way. So, don't you think it's high time you tested OverVUE yourself? Call or write for more information:



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OverVUE
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Macworld View

The new Desk Accessory/Font Mover, Apple's 20-megabyte hard disk, making psychic discoveries with the Mac, Zen programming, and more

Edited by Herschel Schmedick

As the Macintosh community expands, I suspect that many of you have had some strange or enlightening encounters with the Mac. Or perhaps you've heard of someone else's unique application. Your contributions are welcome, and Macworld pays up to \$50 for each item published. Send your contributions to Macworld View, 555 De Haro St., San Francisco, CA 94107. I look forward to hearing from you.

The Farmer's Macintosh

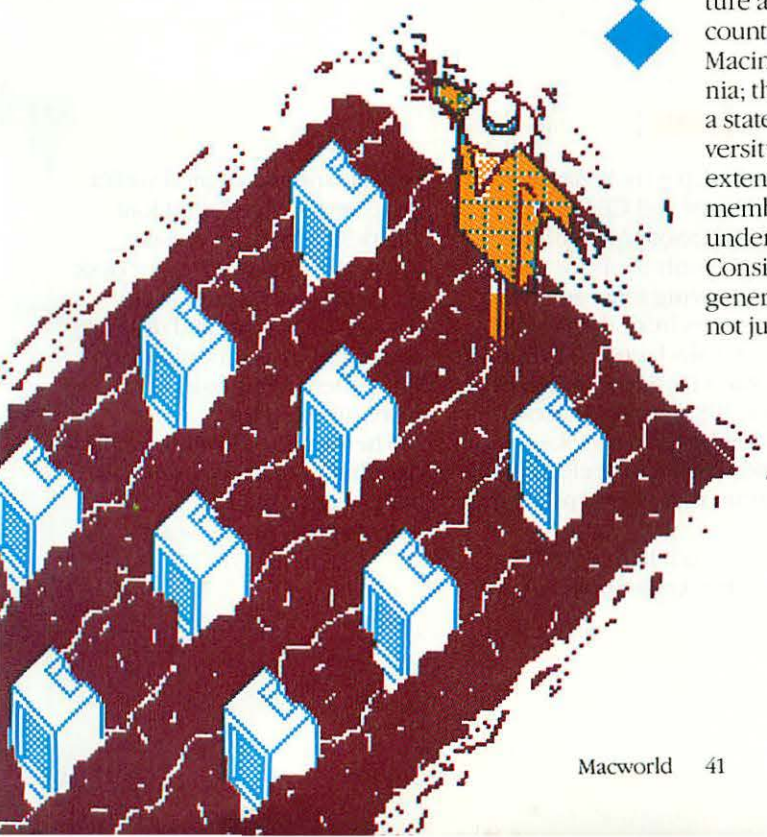
Rural Pennsylvania, where horse-drawn buggies clip along past abandoned nuclear power plants, offers some striking perspectives on technology and its limits. Now, in the midst of an ever-deepening agricultural crisis, county agricultural extension agents have wholeheartedly embraced the technology of the silicon chip in order to provide technical and financial expertise to often-beleaguered farmers.

The program, backed by \$1.9 million from the state legislature and by university dis-counts, has sowed over 200 Macintoshes across Pennsylvania; the computers are linked in a statewide network to a university mainframe. Over 900 extension and university staff members have been trained under the program. Ambitious? Consider that the project is also generating its own software—not just a few applications, but

scores. And then there's the vow of the extension computer support service to respond to any call for help within 15 minutes: "If we don't, we'll send you a free disk."

What is farming like these days? You can get a revealing glimpse from the software under development, much of it in the form of *Multiplan* templates. To name a sampling of what the Mac is busying itself with in Pennsylvania: Dairy Barn Ventilation Sizing, Land Rent Calculator, Nutrient Grain Mix Calculator, Milk Market Comparisons, and let's not neglect to mention Agronomic Custom Rate Generator. From the sound of things, running a farm is at least as technically challenging as handling any small business, though the existence of Manure Analysis Worksheet provides comforting assurance that farming is still farming.

One thing is clear: season after season farmers are forced to live with more financial precariousness than most businesspeople would care to see even once in their careers. Fortunately, at least in Pennsylvania, when the bankers drive up in their long black cars, the extension agent has just the disk the farmer needs.—*Ted Nace*



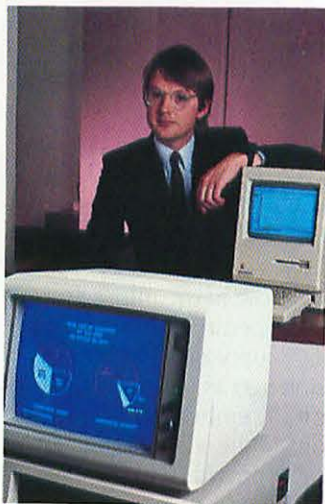
Know Thine Enemy

In its all-out effort to establish the Macintosh Office in the business community, Apple has been briefing its sales force on the competition. For Apple that means educating its 500 field and sales representatives on the IBM PC and leading PC software such as Lotus's 1-2-3.

Ferrin Corporation, a San Francisco-based personal computing services firm, is giving the Apple sales force in-depth training on the IBM PC in business and insights into corporate personal computing. The Apple sales force has to be able to show prospective customers and dealers the comparative advantages of the Mac over the IBM PC and to discuss how the Mac can interface with other IBM equipment, such as mainframes.

David Ferris, chairman of Ferrin, says, "People in corporations want you to understand the technology as it will have to fit into their environment. The corporations expect salespeople to get to know them and help them in their business."

In essence Apple is following an ancient adage: Know thine enemy as thyself. — *Janet McCandless*



Fontastic

Creating fonts on the Mac with Apple's Font Editor program is hazardous duty. A part of the Resource Editor utility, the Font Editor requires a great deal of trial and error. It can cause much suffering and anguish when the system crashes and you lose half an hour of tedious FatBitting. As a superior alternative Altsys offers *Fontastic* (\$39.95), a program that lets you customize an existing font or create your own special-purpose character font. The program includes eight new fonts and has a manual—something Apple's Font Editor sorely needs—that provides background information about fonts and a description of how to use the program's features. For further information contact Altsys at P.O. Box 865410, Plano, TX 75086, 214/596-4970.

New Font and Desk Accessory Mover

One of the benefits of owning a Macintosh is the great variety of fonts and desk accessories available. Macintosh fonts exist for virtually every language, not to mention the picture fonts like Cairo. And there are dozens of unique desk accessories, which are really mini-programs, including calendars, calculators, communications programs, and *MacPaint* en-

hancers. Up to now Apple's Font Mover and CE Software's Desk Accessory Mover have been the only tools for adding and removing fonts and desk accessories from the System files of disks (see "Decking Out the Mac's Desktop," *Macworld*, March 1985). Both programs get their respective jobs done, but wouldn't you prefer a single program that performs both tasks?

If so, you'll be pleased to know that Apple programmer

Bert Sloane has created such a program—an integrated font and desk accessory mover. Known as the Font/DA (for desk accessory) Mover, the utility lets you copy fonts and desk accessories between disks or remove them from disks to create more disk space.

The Font/DA Mover is being distributed on the new Macintosh System disk that is available through Apple dealers.



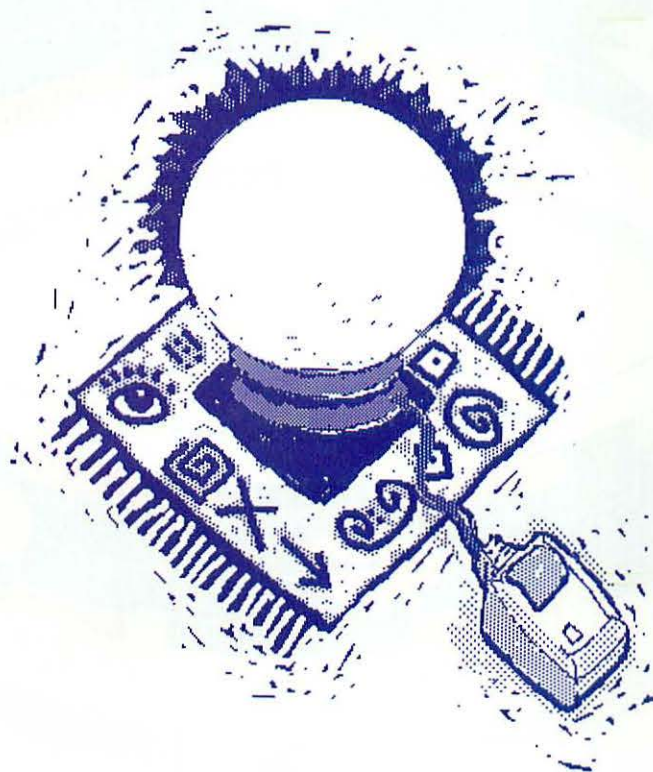
Divining with the Mac

How can researchers use the Macintosh to discover buried archeological sites, help police solve crimes, or find missing persons? The Mobius Society, a Los Angeles-based research foundation, uses people with psychic abilities to perform the aforementioned tasks. Randall DeMattei, the society's executive director, is quick to point out that Mobius uses many forms of research, scientific and historical, in addition to its psychic methods. Mobius has enlisted the aid of psychics for remote viewing projects, such as pinpointing places on a map to indicate the possible location of a buried treasure, in conjunction with *Omni* magazine. The group has also found missing persons for various police departments and has worked on a number of archeological projects in the United States, Egypt, and other countries.

The society recently purchased several Macs to help with many aspects of its research. According to Stephan A. Schwartz, chairman and research director of Mobius, one of the society's new projects involves searching for a sunken ship. They use the Thunder-Scan image digitizer to copy a

map of the area where the ship is thought to have gone down and then paste the image into *MacPaint*. The psychics, or "respondents," who are not so-called "professional" psychics but ordinary people who have psychic ability, look at the map on screen and mark the places they feel are likely to contain something. After all the respondents have gone over the map, a consensus map is created to show where the marks cluster.

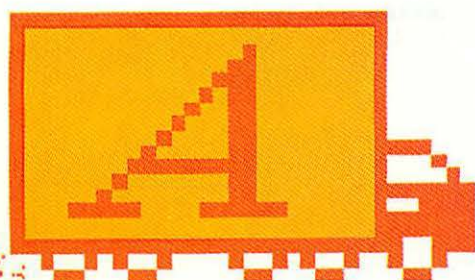
The respondents keep a running commentary of what they "see," which is later put into a *MacWrite* document. Mobius plans to use the mouse for this "map dousing" to discover whether gifted psychics can enhance their talent with the mouse and a computer or whether the high-tech method inhibits their ability.—Rob Swigart

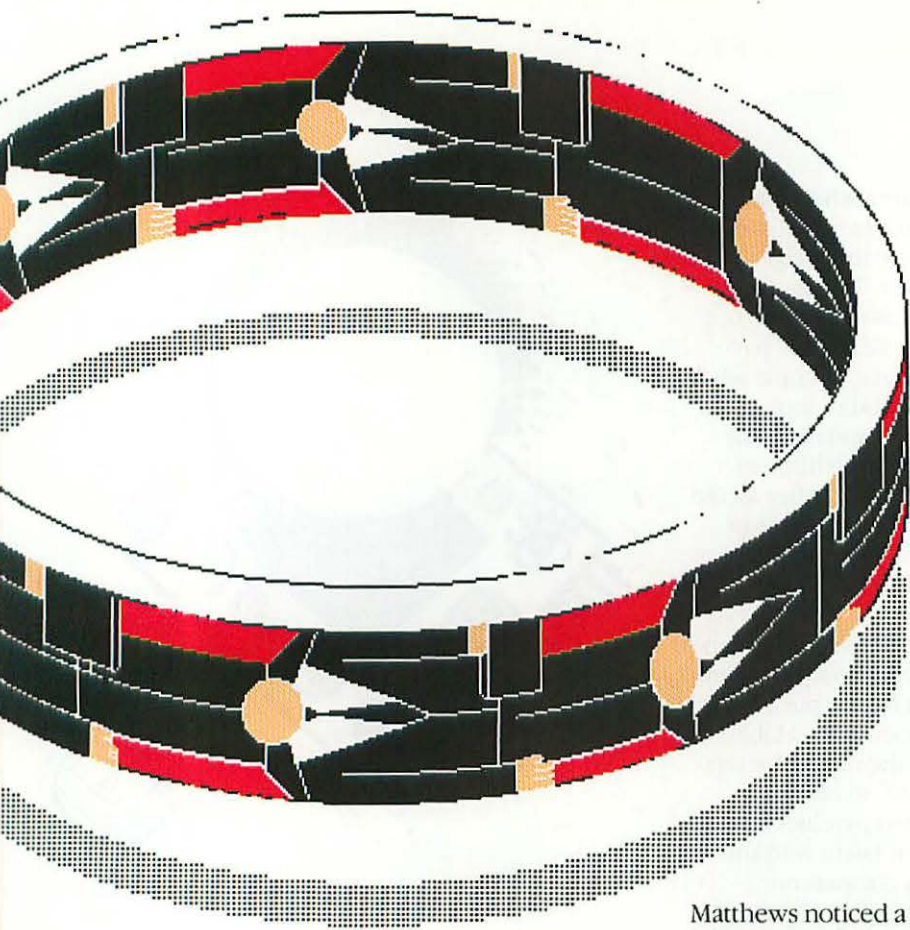


Macworld's Top 10 Best-Selling Business Software

Months on chart	Last month	This month	Product
1	1	1	<i>Multiplan</i> , Microsoft
1	2	2	<i>Microsoft Word</i> , Microsoft
1	5	3	<i>Microsoft Chart</i> , Microsoft
0	—	4	<i>Microsoft File</i> , Microsoft
1	4	5	<i>pfs:file</i> , Software Publishing
1	7	6	<i>pfs:report</i> , Software Publishing
1	8	7	<i>MacTerminal</i> , Apple Computer
1	3	8	<i>Dollars and Sense</i> , Monogram
1	6	9	<i>MacProject</i> , Apple Computer
0	—	10	<i>Helix</i> , Odesta

Source: InfoCorp





Zen and the Art of Macintosh Programming

Programmers seeking to understand the Mac might be well advised to put aside their technical manuals and take a trip to the Orient. At least that's the suggestion of author Keith Matthews. While writing his book *Assembly Language Primer for the Apple Macintosh* for New American Library's Plume/Waite imprint,

Matthews noticed a close parallel between the Mac's architecture and many sophisticated organizational concepts of Japanese management.

According to Matthews, computers such as the Apple II and the IBM PC are like the typical Western organization, structured as a "pyramid of authority, with the boss at the top and ever expanding positions as the chart moves to its wider base of workers." For information to flow between the top and the bottom, it has to pass through a number of layers of managers, a cumbersome, unreliable method at best. "There is," he writes, "another type of organization, infinitely more complex in its internal communication and decision-making process. In Japan it is called the *magic circle*, and Japanese corporate management has exploited this method effectively to solve corporate problems." The distinguishing feature of the magic circle is direct communication among the various levels of authority.

Just as members of a Japanese magic circle are drawn from throughout the company, inside the Mac the ROM routines that constitute a particular manager, such as the Window Manager, are spread out over the entire ROM. The Window Manager, for instance, invokes facilities from several other managers—including QuickDraw, the Control Manager, and the Event Manager—to manipulate a window on the screen.

Since the Mac's resources consist of nearly 30 managers, drivers, and handlers, as well as over 400 routines, this system can be confusing for programmers of conventional computer systems. Matthews states, "The big question traditional programmers have to get out of their psyches is, Where is the Window Manager? or any other manager for that matter. The answer is everywhere and nowhere. You cannot point directly to a manager, because a manager is made up of lots of workers [routines]."

But if the system of sharing common functions is confusing to programmers, according to Matthews it is the secret behind how Apple put "so much sophistication into so small a ROM. Don't let this confuse you," he continues, "the routines act like they are grouped together, and that is the important thing for you to know as you develop programs." Is there a hub to the magic circle? Yes, it's called the Trap Dispatcher. But that's another story, one about soul and heart. Read about it in Keith Matthews's book.

Michael Tchao, a senior at Stanford University majoring in product design, is the organizer of a unique computer science course at Stanford: CS 1C, "Using the Macintosh at Stanford." In January 1984 Tchao attended the annual Apple shareholders meeting, where the Macintosh was first unveiled, and heard what he calls "the gospel according to Steve Jobs." The Mac so sparked Tchao's interest that he talked to Stuart Reges, the assistant chairman for undergraduate education in the computer science department, about using Macs in introductory computer science courses.

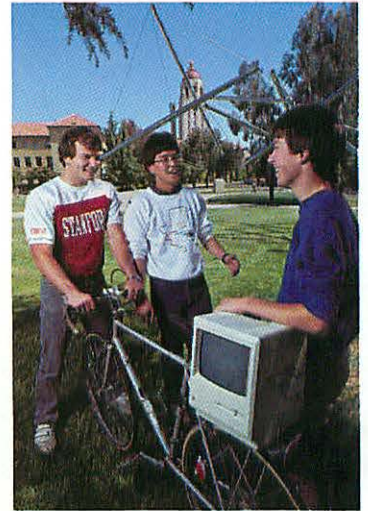
During the summer Tchao, Reges, and teaching assistant Bill Berner developed an introductory course to teach students how to use applications

rather than how to program. They tested a prototype of the course on freshman football players, who spend August practicing on campus. "The Macintosh seemed very small in the hands of Stanford's largest freshmen," Tchao said. But the enthusiasm was great, and the summer experiment proved a success.

CS 1C was introduced as a one-credit course for fall quarter of 1984. The class consists of small sections that meet once a week, during which teaching assistants give tutorials on specific application programs. Each student is required to purchase a course binder of labs on the software covered in the course. Each

class begins with an overview of a product's capabilities, followed by a 1- to 1½-hour exercise designed to help students explore the program in depth.

The course is so popular that about 200 students are enrolled, in ten sections. Some sections meet in classrooms, while others are taught in dormitories as part of a residential education program. Wherever the sections meet, the course is fired by the enthusiasm of the students. Tchao supervises ten undergraduate teaching assistants and is working with them and editors at Apple Computer to publish the course binder. He hopes that after he graduates, his disciples will go on with the class and continue to spread the Macintosh gospel on campus.—Clay Andres



Apple's Hard Disk

There's no scarcity of hard disks for the Mac; I count at least a dozen available. One of the glaring problems in the Macintosh world, however, is the lack of a hard disk standard. Each hard disk has a different way of handling the software interface to the Mac, and none of the strategies works perfectly. Another problem is that most hard disks connect to the Mac through the serial port rather than the disk drive port. The throughput of the disk

port—the speed at which data can be transferred to an external device—is two to three times faster than that of the serial port.

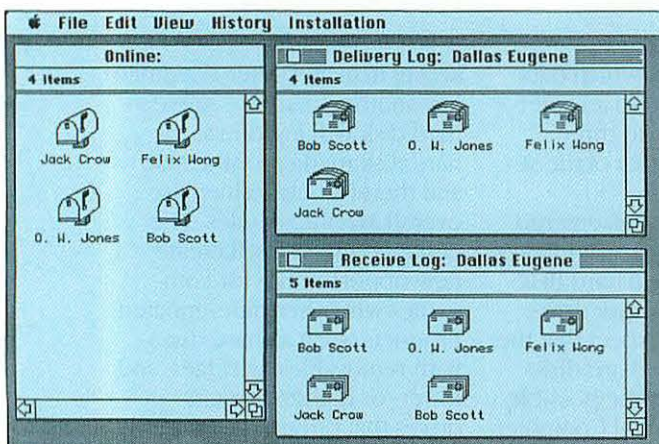
Now that Apple has entered the Macintosh hard disk market with a 20-megabyte hard disk that plugs into the disk drive port, you would expect that the sales of non-Apple hard disks would suffer, with the possible exception of General Computer Company, which manufactures the HyperDrive internal hard disk. But Apple product mar-

keting manager Peter Friedman has another analysis: "Apple's hard disk will legitimize the hard disk market for the Mac and thereby help to increase overall Macintosh sales. The enlarged market will create new opportunities for companies who offer differentiated products, such as hard disks with removable cartridges, and lower- or higher-capacity drives that provide good performance for the price." □

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5:35 a.m.

Your city is under attack from hostile forces. Hot air balloons have started releasing a deadly shower of bombs in an attempt to break your city's protective shield. Dive bombers are zooming in for a full scale attack.

The battle has just begun...

9:08 a.m.

Smart bombs come hurtling through the air... You fire and miss, fire and miss. What's happening?! You've never seen anything like them... how do you destroy them before they destroy you? OH, NO! You're losing your high-energy shield!

11:23 a.m.

Armed paratroopers are dropping from the skies in droves. You begin to realize that defending your city is no easy mission. You fire from one of your three MacCommand bases. ZapZapZap! Got one, got two... But, they're coming too fast. Paratroopers have penetrated your city...

4:52 p.m.

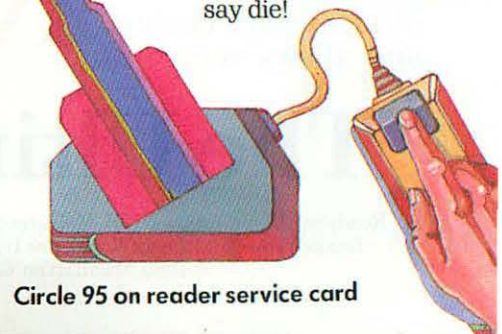
They've destroyed your main missile base. They've detonated city hall! Ambulances are on their way to collect your wounded. What a disaster!

But there's more to come...

9:47 p.m.

NOT THE DREADED SPINNERS! With spinners zinging through the air, firing smart bombs randomly in rapid succession, how much longer can you hold the enemy back?

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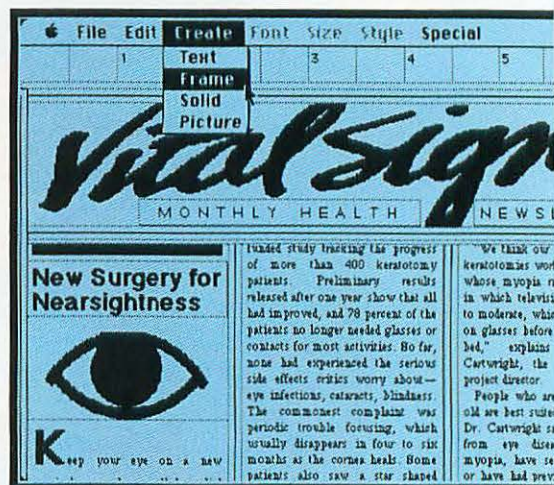
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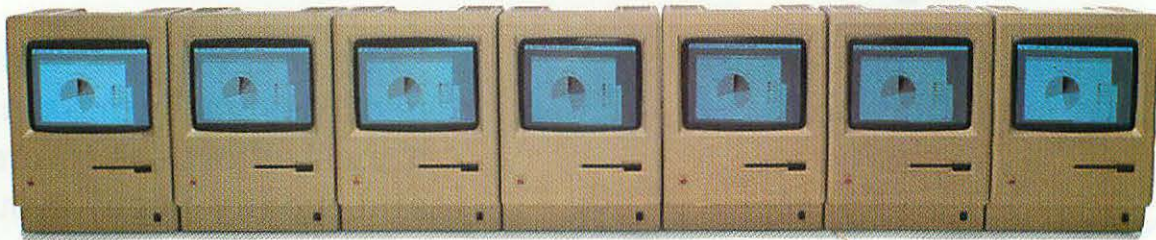
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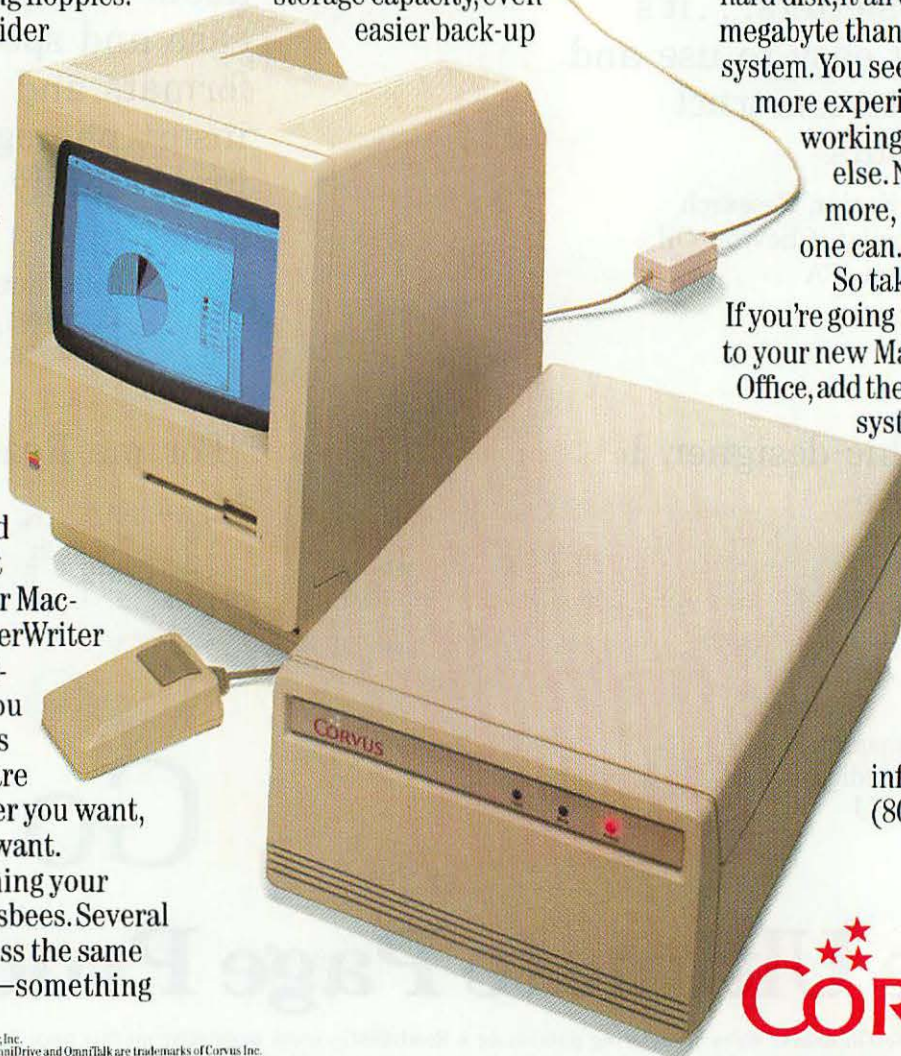
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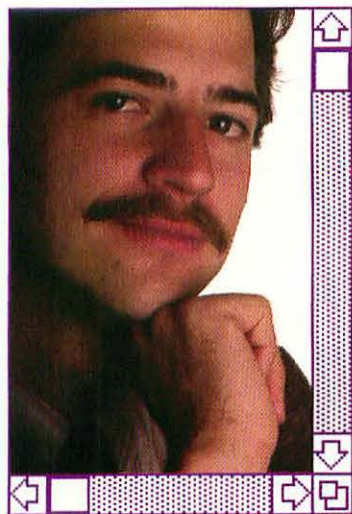
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Get Info

Macworld's tutor answers questions about Pascal, printers, and numeric keypads

Lon Poole



Get Info *answers questions about the Macintosh and how it works. Most inquiries deal with application programs, but no topic is too elementary or too advanced. Discussions range from setting up the Mac to programming in BASIC and Pascal. When you need advice about using the Mac, drop me a line. I cannot respond to individual letters, but I will answer the most representative questions.*

This month I tackle the problems of three writers: one needs to count the words in a document, another wants to type formulas that use multi-level subscripts and superscripts, and a third wants to save notes on 3- by 5-inch cards but can't find a program that prints them.

And what happens if you plug an extra-high-resolution dot matrix printer like the Toshiba 1340 into your Mac? A Macintosh Pascal programmer suspects there must be some way to put data files on separate disks, but the manual doesn't say how. If you're into assembly language, I have some information on 68000 assemblers that run on the Mac.

Finally, one spreadsheet jockey asks about the numeric keypad, and another wants to know how to use the Clipboard to transfer data from *Multiplan* to *MacWrite*.

Word Counting

Q. Is there any way to use my Mac to count the number of words in a *MacWrite* document?

*Dolores Gwynn
Salina, Kansas*

A. Almost any spelling-checker program displays a count of the number of words in a document. Assimilation's *Mac Spell Right* works with *MacWrite* version 4.0 or later. *Hayden:Speller* from Hayden Software works with *MacWrite* and *Microsoft Word*.

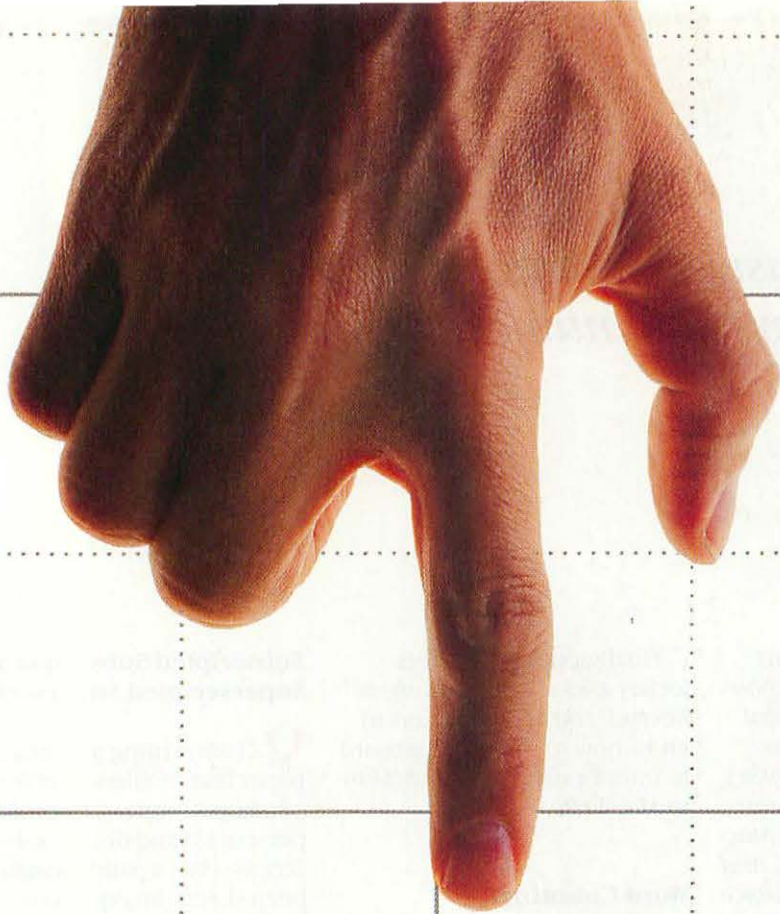
You can use the Get Info command to find out the number of bytes in a document, which approximately equals the number of characters. You can also estimate the number of words in a *Microsoft Word* document based on the number of characters. Every time *Word* opens or saves a document, it displays the number of characters in the lower-left corner of the document window. Divide the character count by six (an average of five characters per word plus a space) for an estimate of the number of words.

Subscripted Subscripts and Superscripted Superscripts

Q. I am writing a technical paper that requires double subscripts (subscripts of subscripts) and double superscripts (superscripts of superscripts). I have painstakingly been doing the equations in *MacPaint*, then inserting them into *MacWrite*. Is there a way to obtain the desired results using only *MacWrite* or *Microsoft Word*?

*Michael J. Dunn
Manhattan Beach, California*

A. Special superscript and subscript fonts contain letters and numerals that are raised above or below the standard position of characters on a line. When you use these fonts in *MacWrite*'s plain text style, you get ordinary superscripts and subscripts. When you use these fonts in Superscript or Subscript style, you get double superscripts and subscripts. *Dayton Fonts* (\$15 from Plugh, P.O. Box 358, Dayton, OH 45459) includes superscripts and subscripts, ornamental Greek and English alphabets, a square root tool kit, fraction connectors, dots, integrals, sums, large brackets, and other symbols used in equations. *SciFonts* (\$49.95 plus \$2 shipping from Paragon Courseware,



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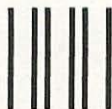


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4954 Sun Valley Rd., Del Mar, CA 92014, 619/481-1477) includes a 12-point cursive font and 12-point regular, 9-point superscript, and 9-point subscript fonts of the English and Greek alphabets, Arabic numerals, and mathematical symbols. The fonts can be installed in any System file with the Font Mover program and work well with both *MacWrite* and *Microsoft Word*.

Imagewriter-Compatible Printers

Q. Can the Toshiba 1340, an "Imagewriter-compatible" printer, print Macintosh documents at its claimed resolution of 240 dots per inch?

*Julius Bazan
Glen Oaks, New York*

A. Like many printer manufacturers, Toshiba offers a program called a *printer driver* that allows you to print *Mac-*

Write and *MacPaint* documents with one of its printers instead of an Imagewriter. The Toshiba driver gives you a choice of standard-, high-, or letter-quality printing. The standard- and high-quality printing options on the Toshiba 1340 produce printouts that look the same as on the Imagewriter; they do not take advantage of the Toshiba printer's extra-high resolution. Letter-quality printing does take advantage of the Toshiba printer's 240 dots per inch with a font built into the printer. However, the letter-quality font comes in only one size and only in plain, bold, italic, underline, superscript, and subscript styles. Also, pictures in a *MacWrite* document are not printed if you choose letter-quality printing. Toshiba advises against using its printer driver with applications other than *MacWrite* and *MacPaint*.

LetterWare and *MatrixWare*, printer drivers from Intrepid Technologies (P.O. Box 31211, Santa Barbara, CA 93130, 805/685-6770), allow the Mac to print graphics and letter-quality text on the Toshiba printer. *ProPrint* from Creighton Development (4931 Birch St., Newport Beach, CA 92660, 714/476-1973) prints only letter-quality text on the Toshiba 1340. These drivers also work with many other printers.

MacPascal Data Disks

Q. How can MacPascal access a data file on another disk? The MacPascal application disk, which must be inserted to run a MacPascal program, has only about 100K available after you remove nonessential files—not nearly enough for the data file used by the program I am writing.

*Miguel Karen O'Brien de Lacy
Sorocaba, São Paulo
Brazil*

A. Accessing data on a separate disk is best done with an external drive. Doing so with only the internal disk drive calls for some single-minded disk swapping. Gaining access to a file on another disk in a MacPascal program requires you to prefix the name of the file with the name of the disk, called the volume name, and a colon. The sample program *FileDemo* (see the listing) opens three files—named *Subscribers*, *Advertisers*, and *Distributors*—on a disk named *Magazine*.

If the disk named *Magazine* has been ejected, a dialog box appears, asking you to insert the disk. However, if the disk was not inserted prior to starting *MacPascal*, the program stops with the message, "At-

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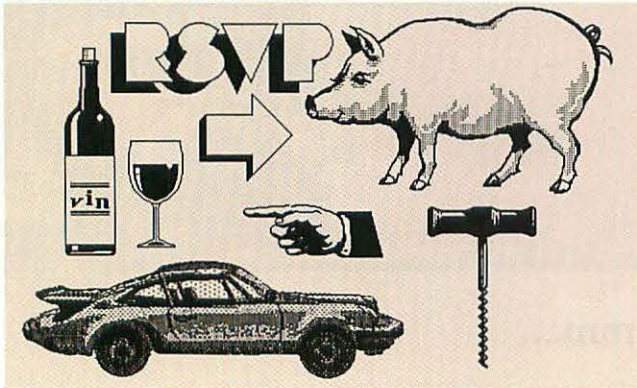
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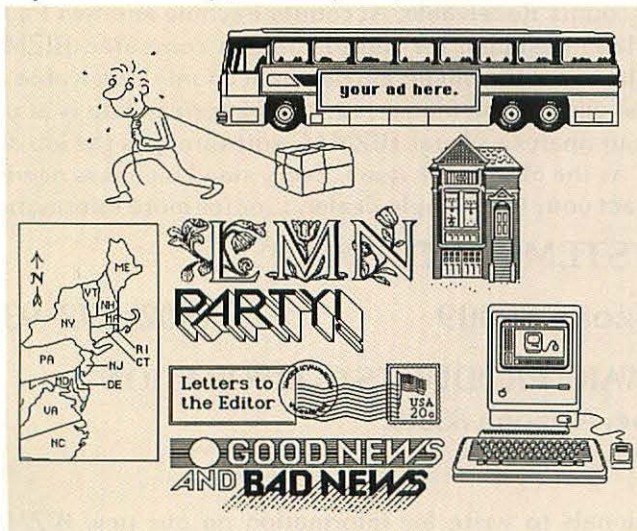
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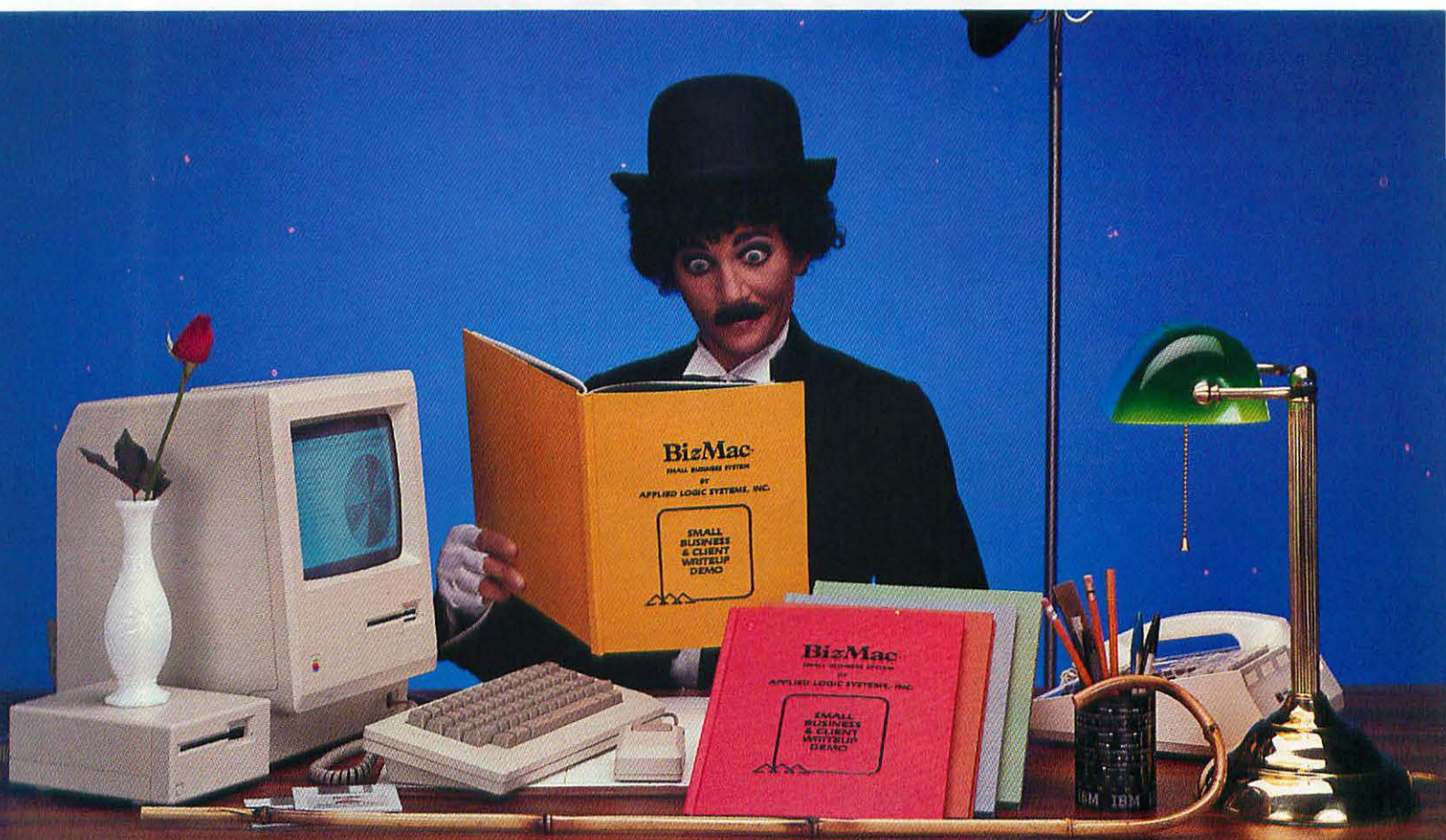
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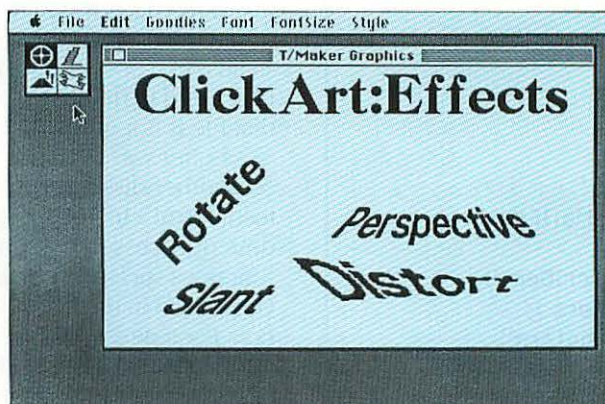
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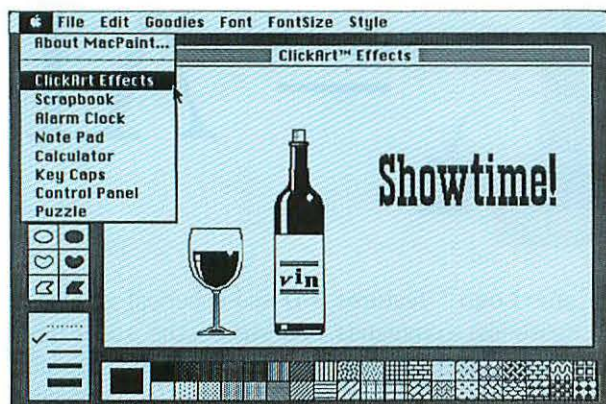
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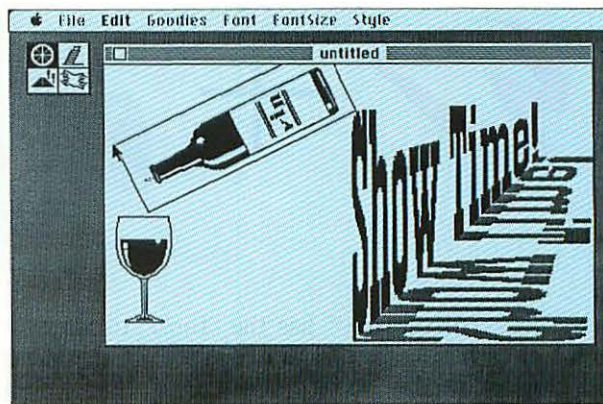
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Get Info

tempt has been made to access a file on a disk or volume which is not known to the system," and the thumbs-down pointer

appears on the program line that calls for the file access. A simple way to avoid this interruption is to declare a string variable, such as `fileName:string`, and add the following line to

```
program FileDemo;
type
  MailRecd = record
    idNo : integer;
    name, title, street, city : string[30];
    state : string[2];
    zip : string[9];
  end;
  MailFile = file of MailRecd;
var
  SubscrFile, AdFile, DistrFile : MailFile;
begin
  Open(SubscrFile, 'Magazine:Subscribers');
  Open(AdFile, 'Magazine:Advertisers');
  Open(DistrFile, 'Magazine:Distributors');
end.
```

FileDemo

A short MacPascal program that opens three files on a disk whose volume name is Magazine. Each file consists of the records defined as "MailRecd."

the program ahead of the first Open procedure:

```
fileName := OldFileName('Insert
Magazine disk, click Cancel')
```

The Macintosh Pascal standard procedure `OldFileName` displays the specified message inside a dialog box. The box gives you a chance to insert the required data disk after you eject the program disk if you have only one disk drive or to insert the data disk in the external drive. However, if you instead try to open one of the files listed in the dialog box, that file is not opened.

A better way to access a file on another disk is to use Macintosh Pascal's InLine facilities to directly access procedures and functions such as `Eject` and `GetVolInfo` in the ROM Toolbox. For a description of the InLine facilities, see the InLines document on the MacPascal disk. For a description of the

Toolbox procedures and functions relevant to disks, see the File Manager section of *Inside Macintosh* (Apple Computer, 1985).

Native Mac Assemblers

Q. I am interested in an assembler for the Macintosh. I can't afford a Lisa and must limit my programming to the Mac. Also, is the bound version of *Inside Macintosh* available yet?

Carol R. Shields
North Yorkshire
United Kingdom

A. In April Apple released its Macintosh 68000 Development System (MDS), which runs on a 128K or a 512K Mac with an external drive recommended.



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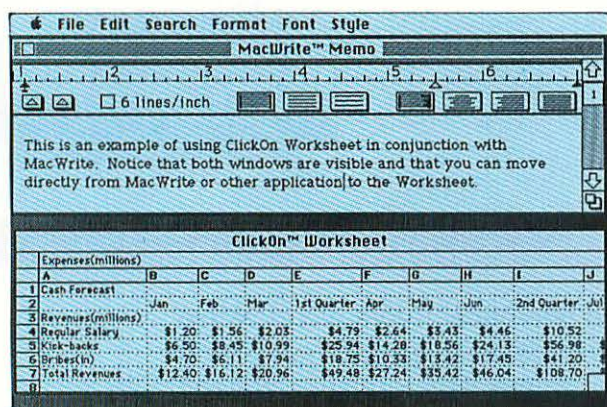
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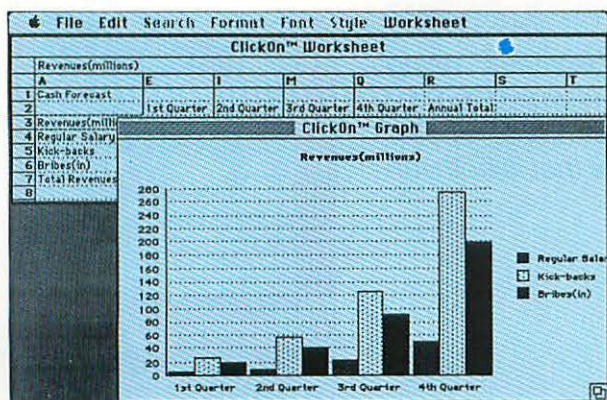
Let's say you're in MacWrite. Without leaving it, you click on a spreadsheet for some quick calculations. Then click on a bar, pie or line chart, made directly from your spreadsheet. Now paste them both into your MacWrite document. Done. All without leaving MacWrite, and without changing programs or disks. And even on your 128k Mac.



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Bar graph created directly from spreadsheet

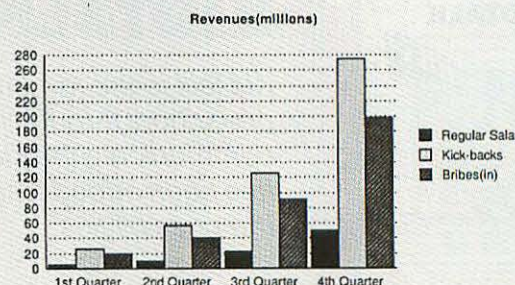
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MacWrite Memo

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	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Revenues(millions)				
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Kick-backs	\$25.94	\$56.98	\$125.18	\$275.03
Bribes(in)	\$18.75	\$41.20	\$90.52	\$198.87
Total Revenues	\$49.48	\$108.70	\$238.81	\$524.67

We have copied and pasted the spreadsheet into this MacWrite memo. Once copied into MacWrite, it is possible to change the font or font style of the spreadsheet. The spreadsheet shows revenues and expenses by month with quarterly summaries. We used the "folding" ability of the Worksheet to copy and graph only the quarterly results instead of the entire spreadsheet.



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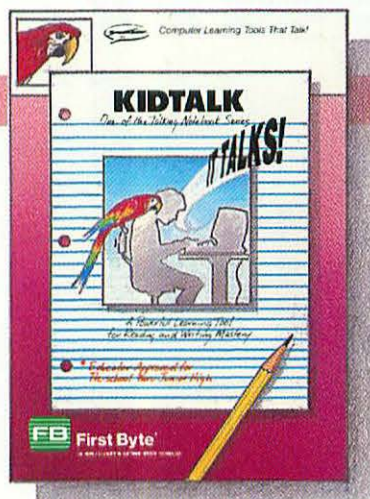
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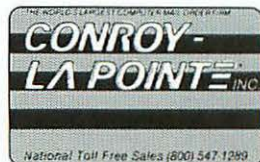


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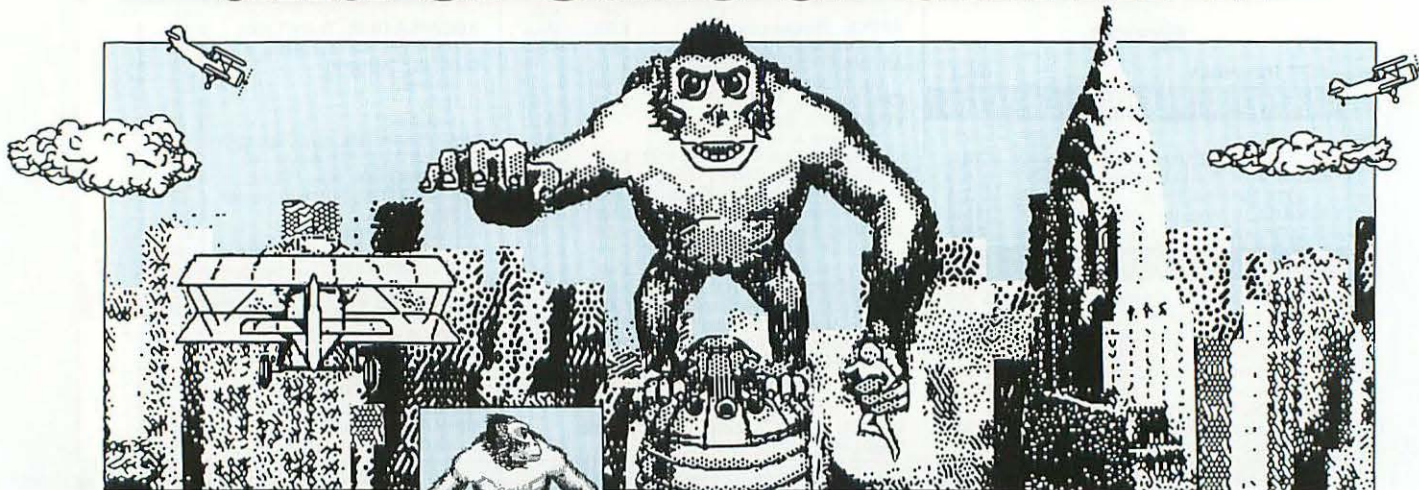
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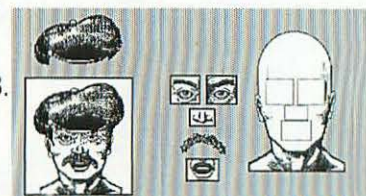
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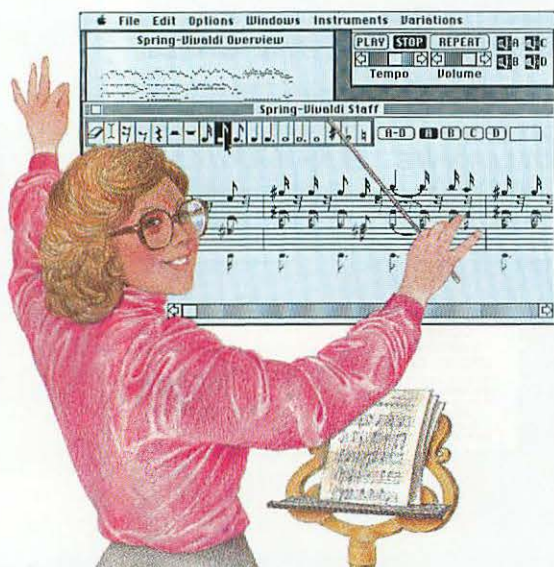
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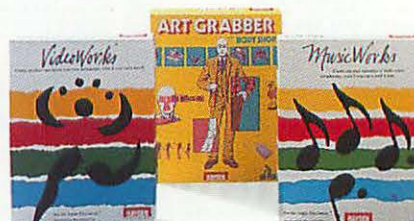
Hayden creativity tools are available for the Macintosh at your local software dealer or contact Hayden Software, 600 Suffolk Street, Lowell, MA 01854, or call 800-343-1218.



Make faces in a blink of an eye with BodyShop.



MusicWorks and you can make beautiful music together.



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HAYDEN
SOFTWARE

MDS includes a 68000 assembler, an editor, a linker, a set of debuggers, a Mac-to-Mac connecting cable, several utilities, an MDS user manual, a Motorola 68000 programmer manual, a copy of *Inside Macintosh*, and a list of system traps and equates. MDS costs \$195 and can be ordered through any authorized Apple dealer or the Certified Developer Program.

Assemblers are also available from other companies. Hippo-C Level 2 (\$399.95 from Hippopotamus Software) is a C development system for the Mac that includes an assembler designed for optimizing C code, not for developing complete applications. Aztek C68K-C (\$499 from Manx Software) is another C development system for the Mac; its assembler is claimed to be adequate for program development in assembly language. *CP/M for the Macintosh* (\$395 from I.Q. Software) is an eclectic selection of ten programs, including a 68000 macroassembler that is reputedly adequate for program development.

The "phone book" edition of *Inside Macintosh*, which is bound and uses thin paper like a telephone directory, is available for \$25 from Apple Computer Mailing Facility, 467 Saratoga Ave. #621, San Jose, CA 95129. Addison-Wesley plans to publish a three-volume regular edition by October as part of the Apple Technical Library.

Lost between Multiplan and MacWrite

Q. How do you move a *Multiplan* document to *MacWrite*? I lose the worksheet when I use the Clipboard.

Anthony J. Oresteen
Batavia, Illinois

A. From *Multiplan* select the cells whose values you want to copy and choose Copy from the Edit menu or press **⌘-C**. Then choose Quit from *Multiplan*'s File menu. If you copied a large block of cells to the Clipboard, a dialog box states "Saving large Clipboard" and gives you two options: "Save formatted values" and "Save unformatted values." Make sure an **X** is in the small box next to "Save formatted values" before clicking the OK button, or the *Multiplan* values will not make it to *MacWrite*. The values (not the formulas) of the selected cells are copied to the Clipboard with invisible tab characters between fields.

From the desktop you can inspect the values on the Clipboard by choosing Show Clipboard on the Edit menu. Since the Clipboard window has no scroll bar, you may not be able to see everything it contains. However, if it is empty or contains only the words "(Custom Clipboard)," you made the wrong choice in the dialog box when you quit *Multiplan*; go back and recopy the cells.

With your *Multiplan* values on the Clipboard, open *MacWrite*. Move the cursor to the spot in the *MacWrite* document where you want to paste the *Multiplan* values. Insert a formatting ruler there and set one tab for each column you're copying. Finally, with the blinking insertion point below the ruler, choose Paste on the Edit menu or press **⌘-V**. The invisible tab characters *Multiplan* in-

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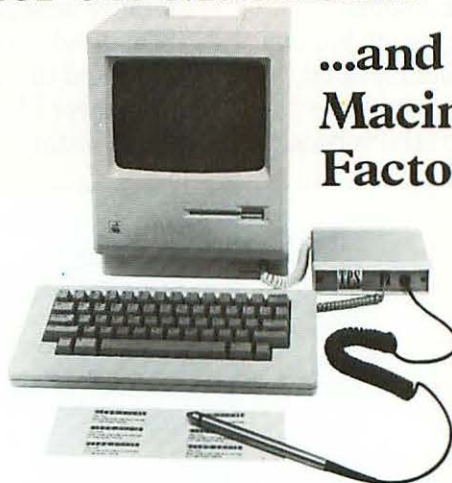
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mean you
never heard
uva Flying
Mouse?

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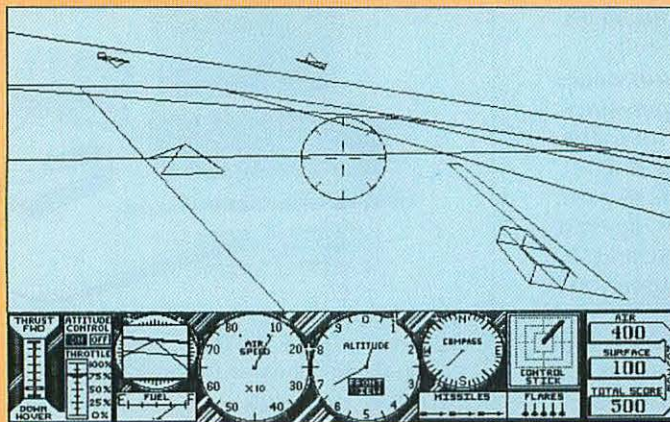


a see
there's

this island off the coast some-
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Circle 37 on reader service card

Get Info

serts between values make the values line up according to the tabs in *MacWrite's* formatting ruler. Adjust the tabs to get the column spacing you want.

Printing on Index Cards

Q. I would like to print ideas and research information on pin-feed 3- by 5-inch index cards but can't use my Imagewriter to do so. I would also like to print a heading on each index card. The heading will sometimes be the same or similar on several cards. Do you have any suggestions?

*Judith A. Shockman
Philadelphia, Pennsylvania*

A. The Page Setup dialog box on most application programs doesn't accommodate a page as small as 3 by 5 inches. However, *MegaForm* (\$295 from Megahaus) allows you to customize page sizes in inches or millimeters. While you normally use *MegaForm* to design complex forms such as invoices (see "The Mac Goes Pro Forma," *Macworld*, July 1985), you can also use it to set up a form that looks like a blank 3-by 5-inch card. Information on the card can come from a variety of sources: the keyboard, spreadsheet-style formulas, tables, and files in the companion *MegaFiler* database program. You specify the sources when you design the form. You could create a *MegaFiler* database containing your notes and headings and use *MegaForm* to print the index cards.

The Numeric Keypad's Special Keys

Q. I bought the numeric keypad to use with *Multiplan*. However, Microsoft's manual doesn't explain how the cursor keys work with the program.

*R. Campbell
Lansdale, Pennsylvania*

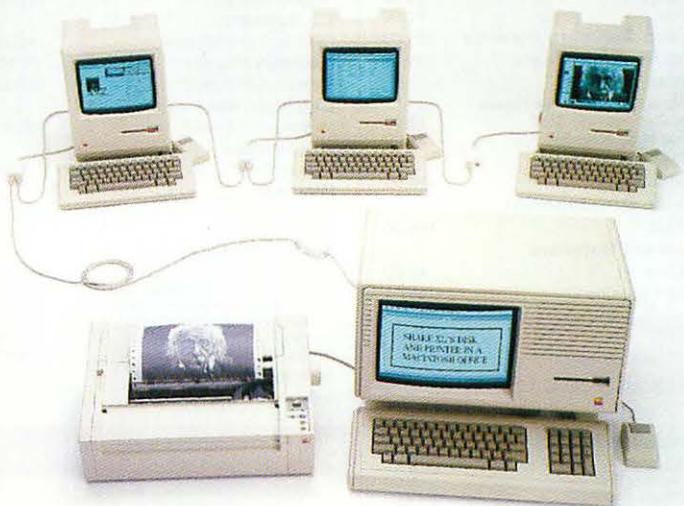
A. Microsoft manuals may not mention the numeric keypad, but Microsoft programs recognize it. *Multiplan* uses the arrow keys to move the selected cell up, down, right, and left the way Shift-Return, Return, Tab, and Shift-Tab do on the standard keyboard, as described on page 35 of the *Multiplan* manual. The Clear key on the keypad clears the contents of the selected cell; choosing Undo on the Edit menu restores the contents. All other keys on the numeric keypad function like their counterparts on the standard keyboard.

Other Microsoft programs recognize the special keys on the numeric keypad. *Chart* uses the up- and down-arrow keys to move up and down a list. In *File* the arrow keys allow you to select an adjacent field or record, while the keypad's Clear key duplicates the keyboard's Backspace key. *Word* lets you use the arrow keys to move the insertion point, select text, and scroll the document.

Send your questions about the Macintosh, Macintosh software, and Macintosh programming to Get Info, Macworld, 555 De Haro St., San Francisco, CA 94107. Send electronic mail to CompuServe 70370,702 or The Source BCW440.

Lon Poole is a Contributing Editor of Macworld. □

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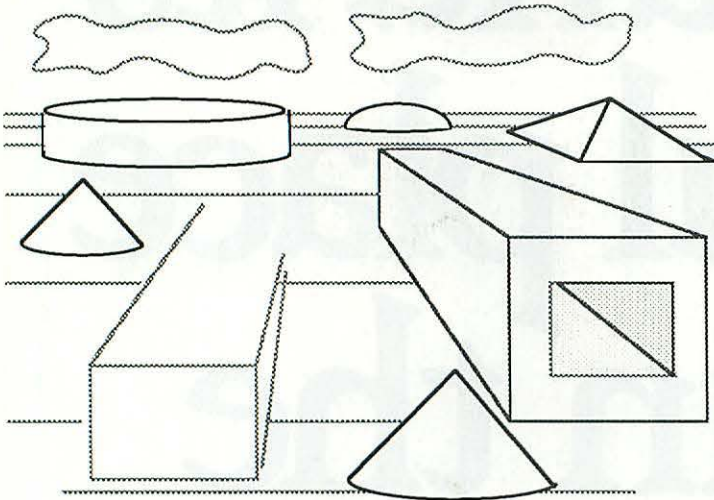
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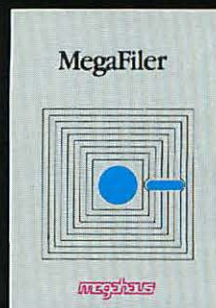
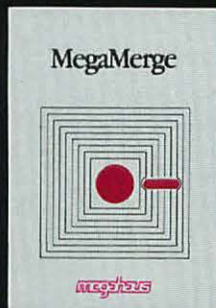
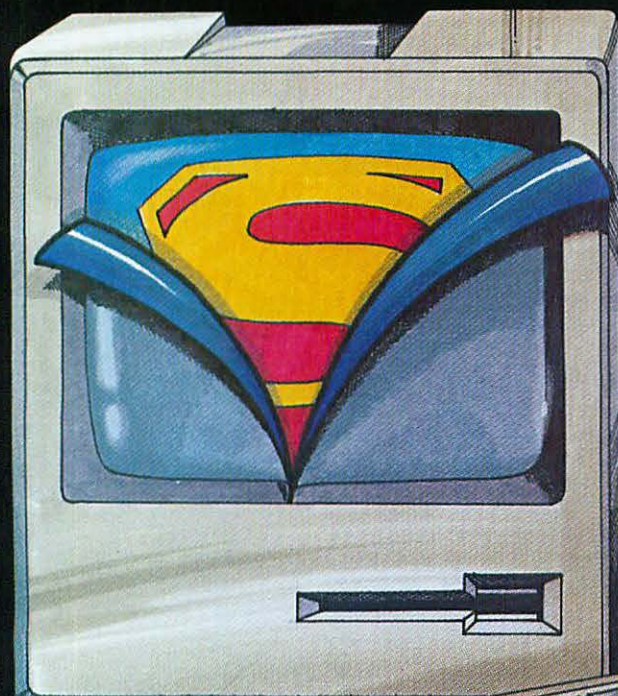
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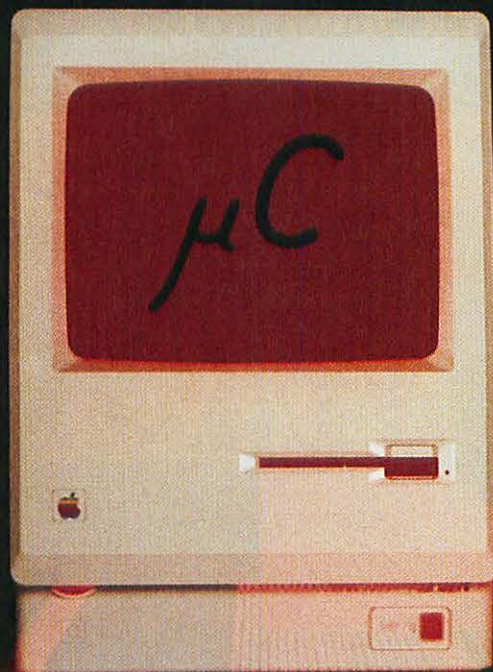
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Presentations with Punch

Gordon McComb

In boardrooms across the United States this scene is often reenacted. An enterprising middle manager presents a report filled with cogent information, but as the presentation unfolds, the manager senses that something is missing. The figures reflect trend-setting developments, but the entire board seems to be—well, bored. Without an effective means of communication, the diligently compiled numbers fall on deaf ears.

Many people have good ideas to share but don't know how to turn their ideas into visually stimulating presentations. People who complain that they don't have the time or the money to produce the graphics that would sell their ideas have overlooked the perfect presentation tool—the Macintosh. Not only can the Mac create dazzling presentation graphics, it can give people in business, education, and other fields control over

■ Getting Started

creative presentations. In fact, software is available that allows you to give electronic slide shows and even animate presentations on the Mac.

Why Graphics?

Studies show that the human brain retains only 10 percent of the aural information it receives but retains 50 percent or more of visual information. The brain accepts visual information 27 times faster than it does aural information. Transforming dry statistics into a picture, such as a chart or a graph, not only helps people remember what you say but enables you to say it quickly.

Furthermore, a 1982 study at the University of Pennsylvania's Wharton School of Business revealed that well-designed graphics led to a significant boost in productivity. With graphics, meetings averaged 28 percent shorter than without. Since a typical middle manager spends 12 hours a week in meetings, visual aids could save a manager 168 hours a year.

Macintosh Presentations

Producing a presentation involves the Mac in two ways. First, you can use it to create charts, illustrations, and other materials with software such as *MacPaint* and *Microsoft Chart*. Second, you can use the machine for the presentation itself, either by printing out the graphics on paper or acetate or by showing the graphics interactively on the Mac screen. Self-running "slide show" programs, such as *Slide Show Magician*, turn the Macintosh into an electronic slide projector, flashing picture after picture on the screen. In fact, the U.S. Library of Congress uses such a setup for a visitor information center.

Creating Graphics

Before you begin building charts, analyze the information you want to present. Since illustrating too many concepts can be as confusing as illustrating none at all, limit your presentation to one or two pictures for each major point. Preparing an outline of your presentation is the best way to identify key concepts and to see where a chart or an illustration fits.

Some information is better suited to graphic representation than other. Large sets of numbers or numbers that require comparison are ideal for charts. For instance, Figure 1 shows a table of statistics, a typical sight in business presentations. The same statistics are shown graphed in Figure 2. Notice how quickly you can absorb the main idea behind the numbers when you look at the chart. Odds are, the chart gives you a longer-lasting impression than the table of numbers.

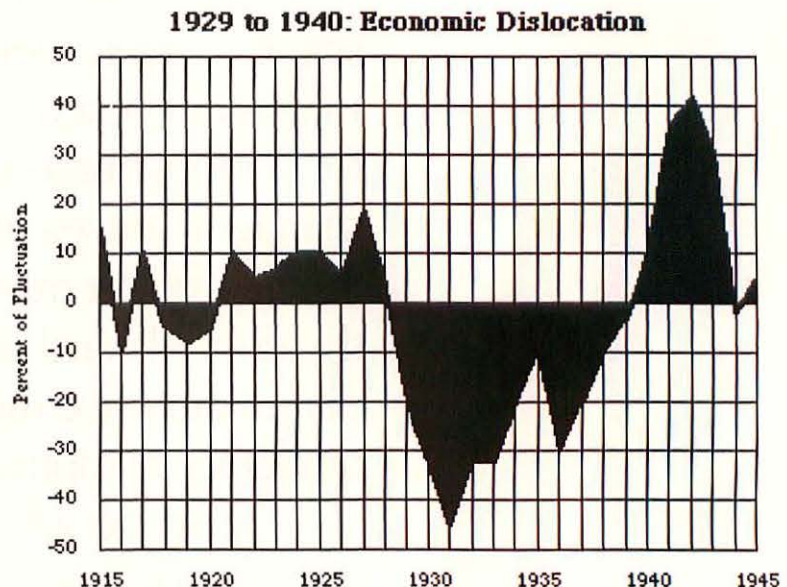
Charting the Numbers

Charts are the most familiar way of graphically representing otherwise colorless data. You can make charts that combine a spreadsheet with graphics capabilities in graphics programs like *Microsoft Chart* as well as in integrated programs, such as *Jazz*. The pro-

Year	Percent	Year	Percent
1915	15	1931	-45
1916	-10	1932	-32
1917	10	1933	-32
1918	-5	1934	-20
1919	-8	1935	-10
1920	-5	1936	-30
1921	10	1937	-20
1922	5	1938	-10
1923	7	1939	-3
1924	10	1940	10
1925	10	1941	35
1926	5	1942	41
1927	18	1943	30
1928	3	1944	-2
1929	-20	1945	5
1930	-32		

Figure 1

Long lists of numbers not only take time to read, but the brain must make a mental image of how the numbers relate to one another before it can compare them. Tables like these may delight statisticians but are the downfall of a presentation.



From *Principles of Macroeconomics* by Edwin Mansfield (W. W. Norton, 1983), based on data prepared by Ameri Trust Co.

Figure 2

This chart represents the numbers shown in Figure 1. The line chart clearly shows how the 11 years prior to World War II were fraught with economic chaos. Percent of Fluctuation refers to how much economic activity deviated from a long-term trend based on economic indicators, such as the Consumer Price Index and the Gross National Product, since 1860.

grams let you enter data into a table or a spreadsheet to produce a professional-looking chart. You can usually choose among bar, line, pie, and other types of charts, depending on the kind of information you want to represent.

If you juggle lots of numbers, spreadsheet programs like *Microsoft Multiplan* and T/Maker's *ClickOn Worksheet* help you get to the bottom line quickly and accurately. Integrated programs are especially suited for this task, since they allow you to switch back and forth between spreadsheet and chart.

Text with Texture

Remember that not all your graphics have to be charts. Display text is used more often in presentations than any other type of graphic. For example, you can show a keyword in large type for each of four ways your company can increase profits. Limit display text to about 36 words, or six lines with six words on each line. Display text is best used to summarize or highlight the points made in the presentation and usually includes graphic elements such as bullets, stars, and check marks (see Figure 3).

You can prepare display text in *MacWrite*, *Microsoft Word*, *MacDraw*, and even *MacPaint*. Select a large font size, preferably a size labeled in outlined numbers on the style menu. The outlined numbers indicate that the fonts are present in the System file and so don't need to be scaled.

You can add flourish to bold but plain graphics by using *MacPaint* to dress up charts and display text with illustrations or enhancements such as borders, shading, and arrows. For example, you can take a flat pie chart created in *Chart* and simulate depth using *MacPaint* (see Figure 4).

Sometimes you want to include graphics in a written report. Macintosh word processing programs let you mix graphics and text on the same page. To insert a chart or other illustration, copy it from the graphics program, open the word processing program, and click where you want to paste in the chart.

Microsoft Word and *MacWrite* let you move the chart on the page. You select the chart and drag the border that appears (see Figure 5). Keep in mind that text and graphics can't go on the same line, and you can't paste two graphics side by side. If you want to position the graphics next to each other, you must do so in the graphics program and then copy and paste them that way.

1985 OBJECTIVES

- Establish East Coast Network
- Begin Reorganization Plan
- Trim Overhead
- Start Employee Benefit Package

Figure 3

Display text helps stress the important points of a presentation. Don't be afraid to mark an overhead transparency while you're talking, but use a nonpermanent felt tip pen.

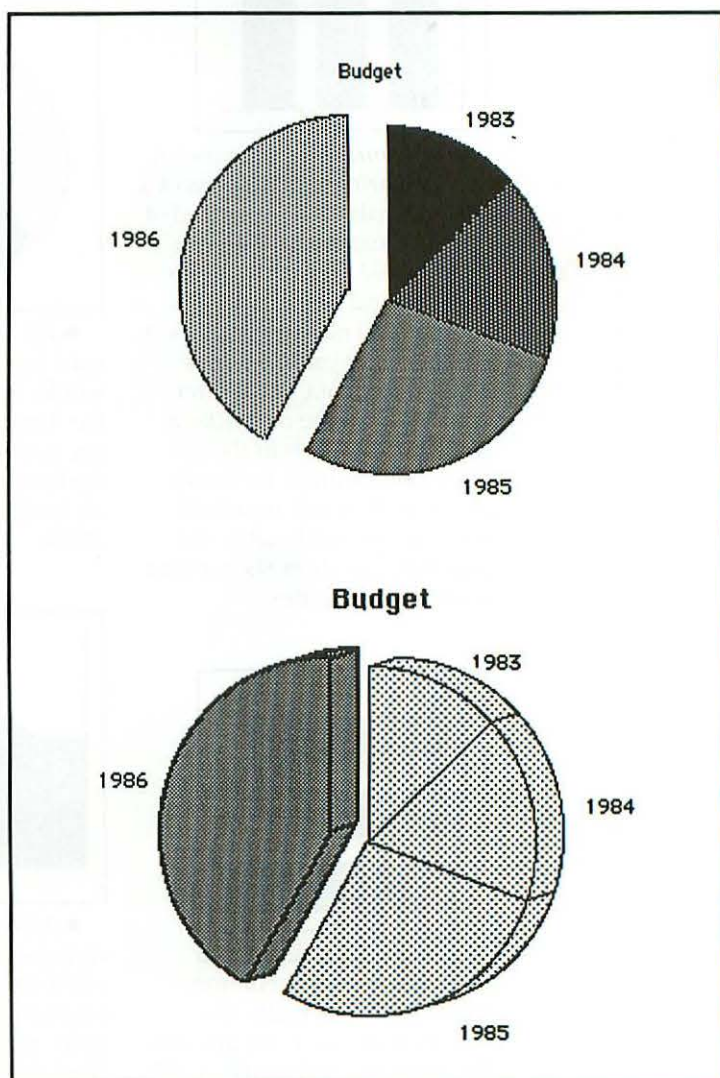
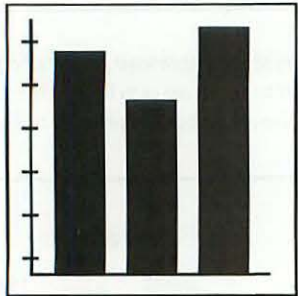


Figure 4

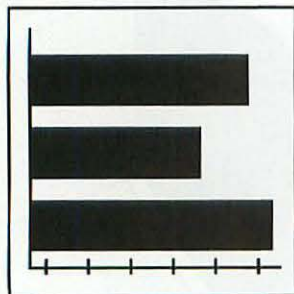
You can add dimension to a graphic by embellishing charts with MacPaint. Here is the chart before and after the MacPaint treatment.

A Chart for All Seasons

Say it with charts, but remember to pick the right one for your data and the story you're trying to tell. Here's a guide to six major chart types and their appropriate applications.

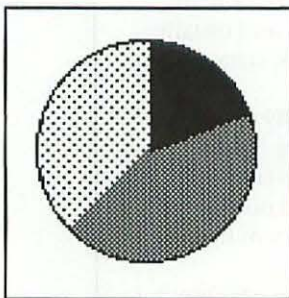


● **Column charts** are useful for comparing the progress of a single variable over a period of time. For example, a column chart would be a good choice to show total dollar amounts over several months or years. A column chart can contain related sets of data, each differentiated from the others by a distinct fill pattern in the appropriate columns. For example, black bars can represent last year's monthly sales, and gray bars can show the current year's monthly sales.

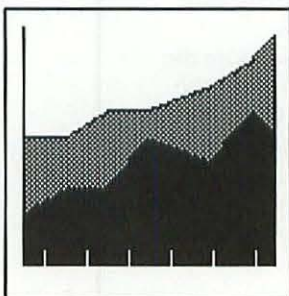


● **Bar charts** are column charts set horizontally. They are often used to compare similar items at a given time. A sliding bar chart shows the correlation of two sets of values. A vertical line in the middle of

the graph is known as the zero point. The first set of values determines the lengths of the bars on the left side of the zero point; the second set determines the lengths of the bars on the right side. If a correlation exists, the lengths of the bars slope evenly down the chart. A sliding bar chart, for example, could show how housing starts decline as interest rates increase.

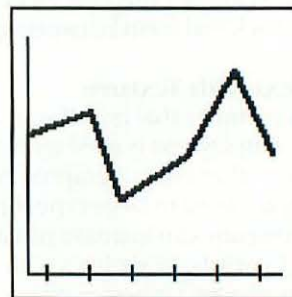


● **Pie charts** show the size of each part as a percentage of the whole. Pie charts compare similar items in terms of their relative contribution to the total. Budgets, assets, and liabilities are usually represented in pie charts.

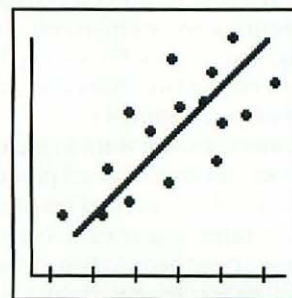


● **Area charts** are a stylistic variation of line charts. Most often they are used to show the relative contribution of two or more items to a total through time. In this sense area charts are like pie charts with the added dimension of time. Each layer representing a set of values is added on top of the layer below. The effect of the layer-

ing is cumulative, with the layers showing the portions of a whole.



● **Line charts** are appropriate when you need to graph four or more sets of data or when you want to show developments over time. They are especially useful for showing trends, since the continuity of a line reflects the continuity of time.



● **Scatter charts** show the relationship between two sets of values. A dot is placed where the two values coincide on the chart. If a correlation exists, a line can be drawn on the chart, following the clusters of dots, to indicate the general trend of the data. Such a line is called, among other terms, a *regression line* or *line of best fit*.

Projecting and Positioning

Among the programs suited to specialized graphics applications, Apple's *MacProject* is excellent for creating step-by-step diagrams of the flow of work and money involved in a project. Project management software is used as a presentation tool as often as it's used to actually manage a project. *MacProject* can produce visual reports that demonstrate the immediacy of deadlines and the impact of crucial phases on the project as a whole. Bear in mind that a complex project might lead you to produce a complex chart. Although you may be able to understand it, break it down into small chunks for your audience.

MacDraw is another valuable presentation tool. Besides its intended job as an electronic drafting set, *MacDraw* is suitable for making elaborate flow and organizational charts because it lets you move individual elements around its drawing pad (see Figure 6). Furthermore, you can cut and paste the graphics from most programs that create charts into *MacDraw*, where you can manipulate the charts as you see fit. Another of *MacDraw*'s strong points is its text-editing capability. The program saves you the trouble of painstakingly positioning text by automatically placing text within a rectangle or other object that you choose.

Presentations in Print

Once you've created the charts, display text, and other graphics, you must decide on a way to make your presentation. The easiest way is to print copies of the charts and other visual aids with the Imagewriter. If the program, like *ClickOn Worksheet*, doesn't have a print facility, you can either paste the graphics into a program that does or print the contents of the screen by pressing the ⌘ -Shift-4 keys simultaneously.

The Imagewriter's print quality is adequate for informal presentations; a laser printer prints graphics with a professional appearance that is appropriate for formal settings. I've produced superb graphics on both the Apple LaserWriter and the Hewlett-Packard LaserJet. Although at \$6995 the LaserWriter is about twice as expensive as the LaserJet, it is more flexible when used with the Macintosh. The LaserWriter prints most types of documents and smooths out the slightly digitized look of computer output to give text and graphics a highly refined appearance.

The LaserJet doesn't smooth out graphics, but it does print them without streaks. You need to install a driver program in the System folder to print *MacPaint* or other Macintosh documents on the Hewlett-Packard printer. A *MacPaint* driver is available from New Image Technology; text drivers are available from SoftStyle and Creighton Development.

If you're going to pass around the graphics to a group of people, make photocopies of the printouts.

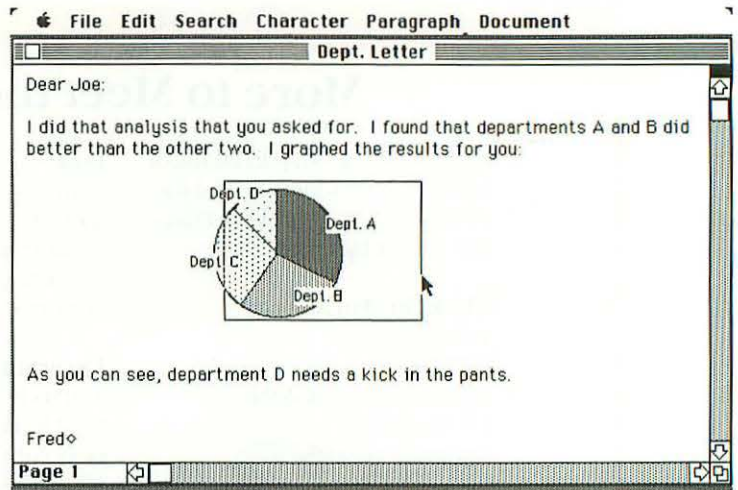


Figure 5

A MacWrite document with a graph pasted from Microsoft Chart. By selecting the graph and dragging the border that appears, you can position the graph anywhere across the page.

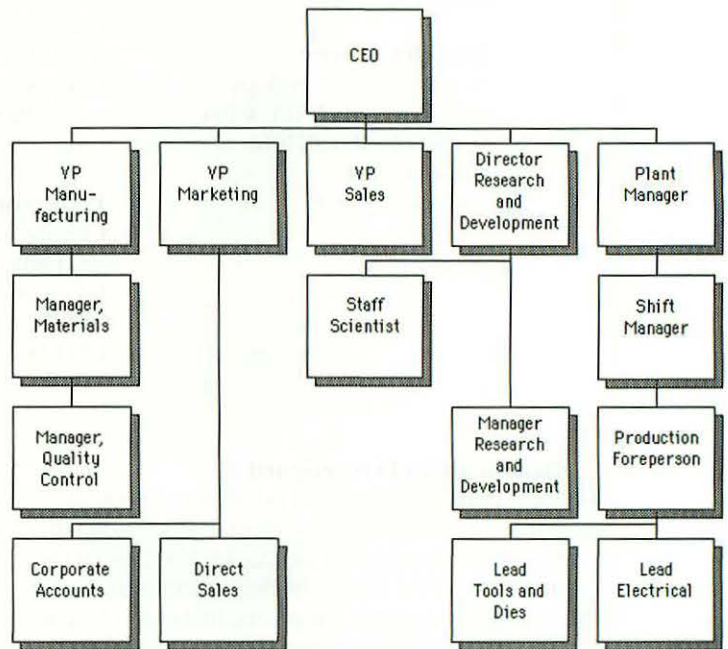


Figure 6

Organizational charts are liable to change; MacDraw's editing features help you update the chart if and when the occasion arises. The drop shadows in this chart were created by duplicating the squares, placing them in the back with the Arrange-Send to Back command, and filling them with the gray pattern.

More to Meet the Eye

The following is a partial list of Macintosh products useful for developing and showing effective presentations.

ClickOn Worksheet

T/Maker Co.
2115 Landings Dr.
Mountain View, CA 94043
415/962-0195
List price: \$79.95

LaserJet

Hewlett-Packard
11311 Chinden Blvd.
Boise, ID 83714
800/367-4772
List price: \$3495

LaserJet Driver

New Image Technology
10300 Greenbelt Rd. #104
Seabrook, MD 20706
301/464-3100
List price: \$39.95

Jazz

Lotus Development Corp.
245 First St.
Cambridge, CA 02142
617/494-1270
List price: \$595

LaserStart

SoftStyle
7192 Kalaniana'ole Hwy. #205
Honolulu, HI 96825
800/367-5600
List price: \$95 including cable

MacDraw, MacProject, LaserWriter

Apple Computer
20525 Mariani Ave.
Cupertino, CA 95014
408/996-1010
List price: MacDraw \$125,
MacProject \$125,
LaserWriter \$6995

ProPrint

Creighton Development
16 Hughes #C-100
Irvine, CA 92714
714/472-0488
List price: \$74

Slide Show Magician

Magnum Software
21115 Devonshire St. #337
Chatsworth, CA 91311
818/700-0510
List price: \$59.95

ThinkTank 512

Living Videotext
2432 Charleston Rd.
Mountain View, CA 94043
415/964-6300
List price: \$245

VideoWorks

Hayden Software Co.
600 Suffolk St.
Lowell, MA 01854
617/937-0200
List price: \$79.95

Word, Chart, Multiplan

Microsoft Corp.
10700 Northup Way
Bellevue, WA 98009
206/828-8080
List price: Word \$195, Chart
\$125, Multiplan \$195

Overhead and Overheard

You can use an overhead projector to project transparencies of documents on a screen instead of passing out photocopies of printouts. The LaserWriter can print directly on sheets of clear acetate, and most photocopiers can copy a paper original onto clear acetate. You can give transparencies a professional appearance by mounting each transparency in a frame.

You can make color overhead transparencies using thermographic copiers and film such as 3M type 288, which produces a color image on a clear background. The image on a sheet of this film can be red, blue, green, or purple. By overlapping sheets of different colors, you can create stunning color charts. The process involves making copies in *MacPaint* of the chart or display text, one copy for each color you plan to use. On each copy erase everything except the parts you want thermocopied in a particular color.

Show and Tell

The best way to get an audience involved in your presentation is to run it on the Macintosh. Its high-resolution screen and interactive capabilities make it a natural show-and-tell performer. *Slide Show Magician*, from Magnum Software, allows you to simulate a slide show by displaying *MacPaint* documents in sequence.

The program offers a number of Hollywood-style transitions, including fades and wipes, to vary the way the *MacPaint* pictures come on screen. For example, a wipe makes an image enter from one side, filling the screen when it reaches the other side. A line chart that appears gradually on screen suggests to the audience that the trends shown developed slowly and not immediately.

You specify the type of transition when you "script" the presentation, telling the program which *MacPaint* documents to show and in what order (see Figure 7). You can also control how long each picture remains on screen. Your specifications are stored in a script that you later play back along with the *MacPaint* pictures, using the program's Projector application.

Slide Show Magician also helps keep people involved by giving the audience some control over the show. When you design a presentation, you can add buttons to the screen that affect slide-projector controls. In addition, the program lets viewers manipulate the Mac's screen. This feature might add drama to a presentation that you run for a small audience, but it has limited value in a self-running presentation.

Slide Show Magician can even run a presentation without you. You can prepare a disk that, when inserted into the Mac at startup, makes the presentation automatically, loading and starting any script document that has *run* at the end of its name. You must also set the Projector program as the startup application and make sure the disk has a System file.

When you create a self-running presentation, you may want to grab the audience's attention the second the computer is turned on. A public-domain program called Screen Maker, available from most Mac user groups, can be used to change the "Welcome to Macintosh" message to a *MacPaint* picture of your choice. Screen Maker works with *Slide Show Magician* or any other startup disk.

Another program that can simulate a slide show is *ThinkTank 512* from Living Videotext. Although chiefly an outlining program without the sophisticated features of *Slide Show Magician*, *ThinkTank 512* lets you flash several *MacPaint* pictures on the Mac's screen each second. You can't alter the transitions between pictures, but you can combine headlines with graphics. The program lets you run through the pictures once or show them in sequence indefinitely.

Animation

One fascinating way to bring a presentation to life is with an animation program from Hayden Software called *VideoWorks*. Although not a "slide show" application, the program lets you assemble professional-quality animated programs using full-screen or partial *MacPaint* images. You might, for example, show a rise in profits by animating a column chart. When you make the presentation, the columns could be short at first, indicating dismal profits. On-screen text would flash: "1984 was a bad year." Suddenly, the columns would start to inch higher and higher. One column could even burst through the top of the chart, like an overheating mercury thermometer. At the top of the screen the text would finally read, "But we're alive and well in 1985."

Up on the Big Screen

The Macintosh's screen isn't suitable for presentations to large audiences. If you plan to use the Mac regularly for such presentations, you may want to attach it to a large monitor or big-screen television. To make the attachment, you add an external video output to the Mac with a modification kit, generally available for un-

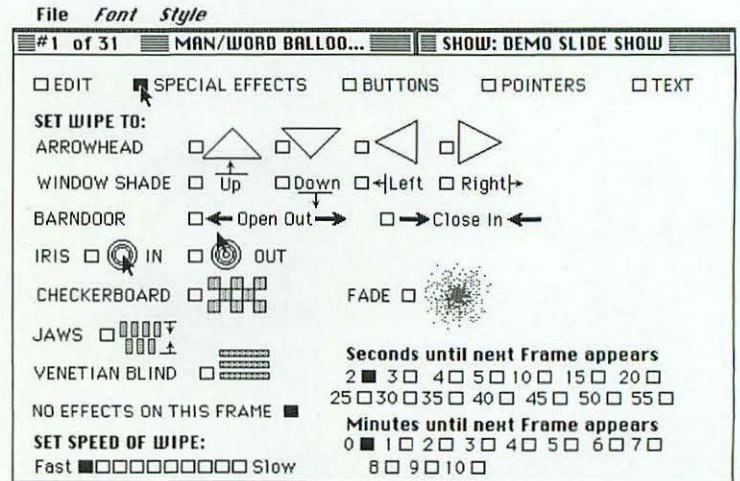


Figure 7

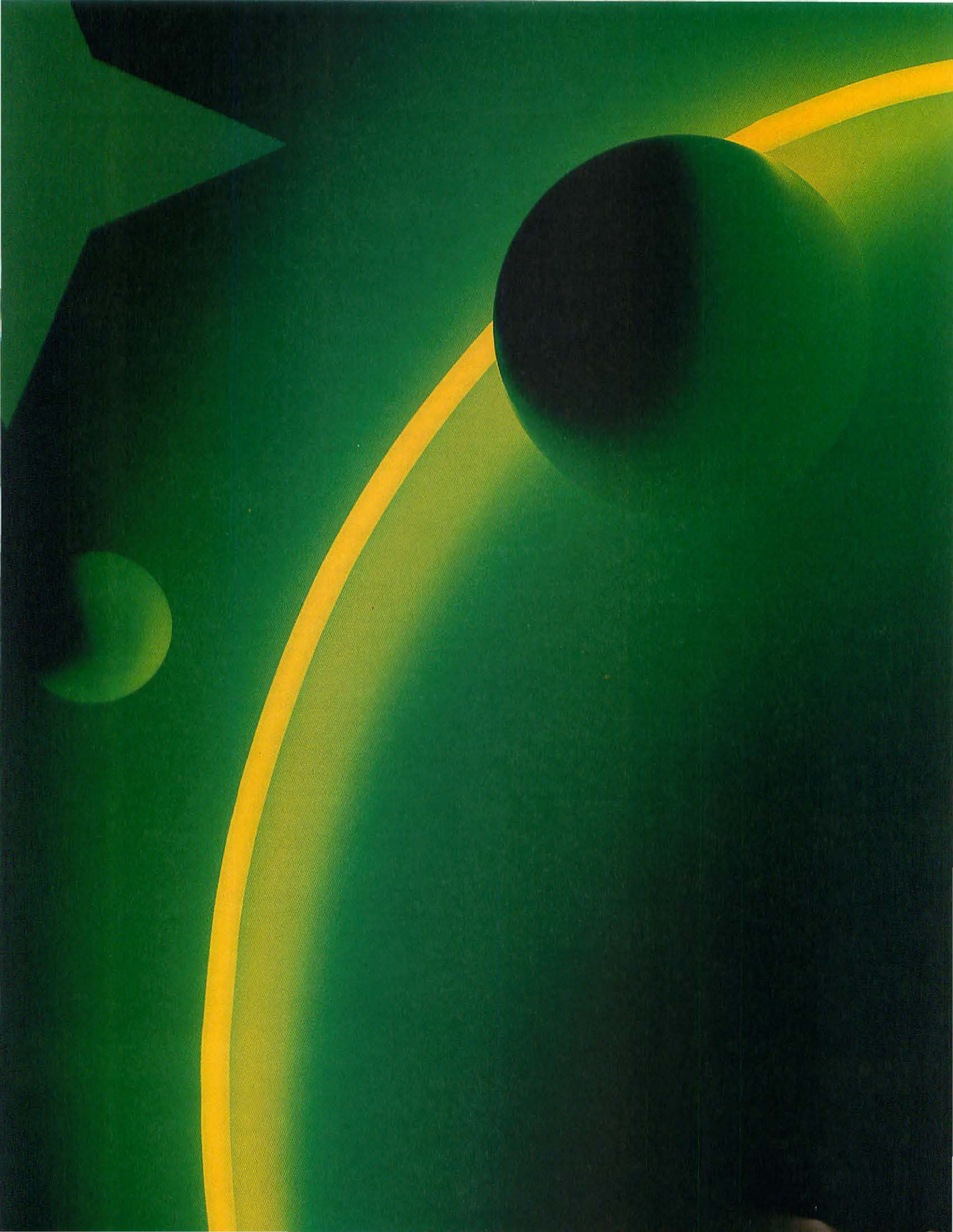
Magnum's Slide Show Magician lets you control the transitions between MacPaint images. You have a choice of arrowhead, window-shade, barndoor, iris, checkerboard, jaws, and venetian-blind wipes, as well as fades and dissolves. You can control the speed of the transitions and the length of time pictures remain on screen.

der \$200. Although most external monitor kits come with instructions on how to take the Mac apart to install the video connection, I suggest that you take it to an authorized dealer if you don't have the tools or aren't familiar with the inner workings of a computer.

The Mac can't be used with standard-resolution monitors. If you add an external video output and then hook the Mac up to a big-screen television, you receive a disappointingly fuzzy picture or none at all. Use only high-resolution monitors—ones with scan rates of 22.5 kilohertz or higher—such as those produced by Professional Data Systems.

Preparing and making a presentation with graphics may sound like a lot of work for a few pretty pictures, but remember that several minutes of your time turning ideas into pictures go a long way toward saving time for yourself and your audience. And if those minutes mean that your ideas will be respected—even accepted—then it's time well spent. □

■■■■■■■■■■ Gordon McComb is
a Contributing Editor of Macworld.



Illuminating Objects

Richard Sprague

One reason the Macintosh is so easy to use is that its designers started from scratch, without preconceived ideas of what a computer has to be. Similarly, developing a new programming language from scratch makes possible a language that is tailored to the unique strengths of a specific machine. Neon, from Kriya Systems, was developed with the Macintosh in mind. Although derived from FORTH, its inspiration comes from Smalltalk, a programming language developed at the Mac's ancestral home, the Xerox Palo Alto Research Center. It differs in many crucial ways from other languages.

Most programming languages let you build programs using procedures in one form or another. In these procedure-oriented languages, programs are sequences of instructions that the computer executes a step at a time.

Programming with Objects

In Neon a program consists of *objects* sending *messages*, or instructions, to one another (see "A Glossary of Object-Oriented Terms"). Although this concept can be difficult to grasp at first, especially if you're used to procedures, object-oriented languages come closer to the way people solve intricate problems than procedure-oriented languages.

In Neon anything can be an object. In a Neon program that draws circles, for example, each circle is treated as an object. A program that goes in and out of files treats each file as an object. And on the Macintosh, menus, windows, and the mouse are objects. You work with these objects by sending messages to them, and they in turn send messages among themselves.

Objects can be organized into classes of similar objects, in much the same way that you organize your perception of reality. For example, you probably have a mental image of a class of objects called "fruits" with subclasses like "apples" and "oranges." This classification lets you think of apples and oranges in similar ways—both are good to eat, both grow on trees—

without getting lost in the details of how they are different. "Fruits," in turn, may belong to a larger class called "food." In Neon this larger category is called a *superclass*.

One particular apple is called an *instance* of the subclass of apples. Like any object, an instance responds to messages and can in turn send messages to other objects. For example, biting into an apple is like sending a message to it; in response the apple sends back a message revealing its sweet taste or crisp texture.

An important property of a class is that an object in that class inherits all of the characteristics of its superclass. For example, apples have certain things in common with other fruits. In addition to those properties that are inherited, you can define new properties, which apply to a particular class of objects. These properties will be inherited in turn by any succeeding subclasses.

When an object receives a message, the action it takes is defined by a sequence of instructions called a *method*. A subclass also inherits the methods of its superclass. Therefore an object can perform the methods defined for its class and its superclass.

The Object-Oriented Computer

The Macintosh uses object-oriented, as opposed to procedural, techniques as part of the desktop metaphor. For example, the Print command on the File menu sends a print message to the selected document. Each document on the desktop "knows" how to respond to a print message.

An object that is a *MacPaint* document, for instance, prints itself using *MacPaint*, because that action is defined by a method that is inherited by all documents in its class.

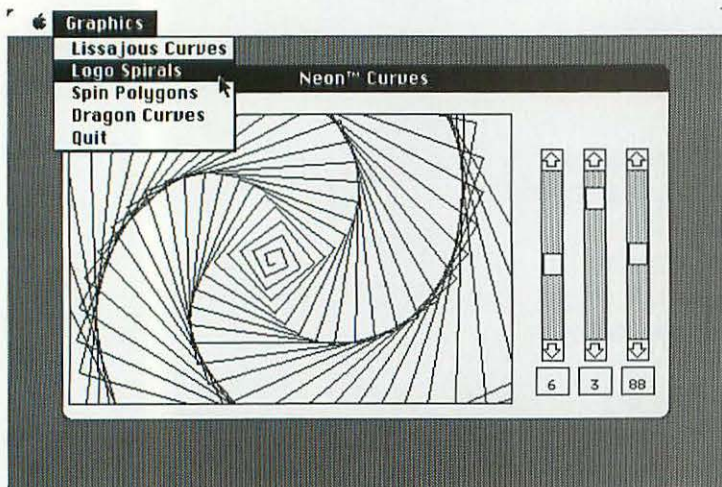


Figure 1

A sample application written by Charles Duff, Neon's principal designer. You can adjust parameters for the curves using the scroll bars. Other types of curves can be drawn by selecting options on the Graphics menu.

```
( define adBoth to add 4 to two values on the stack )
4 value howx 4 value howy
: addBoth ( a b -- b+4 a+4 )
    howx + swap howy +
;

:CLASS Square <Super MyRect
    Int side \ length of each side
    :M NEW: { topleftx toplefty length -- }
        length put: side
        topleftx top!efty
        topleftx length +
        toplefty length + Put: self
    ;M
    :M WANDER:
        Get: side 2/
        1 DO
            GetTop: self addBoth PutTop: self
            GetBot: self addBoth PutBot: self
            Draw: self
        LOOP
    ;M
;CLASS
```

Listing 1

A new class called *Square* is defined here as a special type of rectangle. *Square* inherits all of the methods of its superclass, *MyRect*. Two methods, *New:* and *Wander:*, are defined as unique to objects of class *Square*. Neon allows stack variables, such as *Topleftx* and *Toplefty*, to be referred to by name.

A Glossary of Object-Oriented Terms

Object. Anything in a Neon program that can send and receive messages and perform methods, including FORTH words and their classes, primitives, and variables.

Instance. A specific object of some class, specified to be of a certain type at the time of its creation.

Class. A set of objects that share certain features. A class may have many subclasses but only one superclass.

Subclass. A class that is a subset of a superclass and inherits the methods of the superclass.

Superclass. A class that includes at least one subclass, which—unless specified otherwise—inherits the methods of the class. The highest class is the class Object.

Message. A single instruction sent to an object telling it what action to perform. The action is associated with the method of the class to which the object belongs.

Method. A set of instructions attached to and inherited by any subclasses of that class.

Inheritance. The characteristic features—variables and methods—of a class that are inherited by each new instance of the class. The inheritance chain among classes and subclasses is the key to organizing object-oriented programming.

Since the Mac's user interface is object oriented, developing Macintosh applications in an object-oriented language makes sense. With Neon it is easy to create objects like menus and windows (see Figure 1). Much of the complexity in Macintosh programs results from having to recreate an object-oriented environment with a procedure-oriented programming language.

Defining a Neon Square

Neon is best learned by example. The language provides access to the Macintosh's QuickDraw routines in ROM, including one that draws a rectangle given the coordinates of two corners. But suppose you want to create a specialized rectangle called Square, which is like other rectangles except that all four of its sides are of equal length.

Listing 1 is a Neon program that defines the special rectangle. Like FORTH, Neon is structured so that each new command or word is defined in terms of older ones. The new definitions are added to the "dictionary" that makes up a program. Normally, new words are defined by a *colon definition*, which includes a colon, the name of the new word, and a sequence of previously defined words. A semicolon specifies the end of the definition.

Classes are defined in the same way. In Listing 1 **:CLASS Square < Super MyRect** specifies that a new class called Square is defined as a subclass of the class MyRect, itself a subclass of the class Rect (see Listing 2). The variable Side in Listing 1 stores the integer value of one side of the square. Side is an example of an instance variable, which stores a value for a particular instance. A circle is another class that can be defined as a subclass of a larger class, Oval (see Figure 2).

Neon follows the stack-based Reverse Polish, or PostFix, notation of its predecessors, Smalltalk and FORTH. Like Hewlett-Packard calculators, Neon uses a stack to pass data from one word to another. The last number placed on the stack is the first number read.

In Listing 1 a series of methods for the new class is defined. One method, New:, is a redefinition of the Put: method inherited from the Rect superclass. The Put: method for rectangles expects four numbers on the stack, corresponding to the four corners of the rectangle, and stores them in the rectangle. Since the sides of a square are of equal length, the New: method requires only three numbers: two numbers to specify the coordinates of the upper-left corner and a third number to specify the length of a side. Most other methods for squares are inherited from rectangles and don't need to be redefined.

The Wander: method, however, is a completely new command that tells a square to move itself incrementally across the screen. This method first sends a get: message to Side, an instance variable. The variable responds by leaving its value on the stack. The value becomes an index for a DO loop that moves the square across the screen.

If you need to send a message to an object in the class being defined, you use the word *self*. For example, in the Wander: method, several messages are sent to *self* to get values for the top and the bottom of the square and to put the incremented results back into the current object.

(continues on page 93)


```

:CLASS MyRect <Super Rect

:M COLLAPSE: ( draws concentric rectangles )
  get: self

  getBotX: self
  getTopX: self -
  2/ 0 do
    2 2 inset: self
    \ makes rectangle 2 pts smaller
    draw: self
  loop
  put: self ( reset previous size )
;M

;CLASS

```

Listing 2

The subclass of rectangles called *MyRect* inherits the methods of its superclass, *Rect*. A collapse: message sent to an object of class *MyRect* results in a series of concentric rectangles.

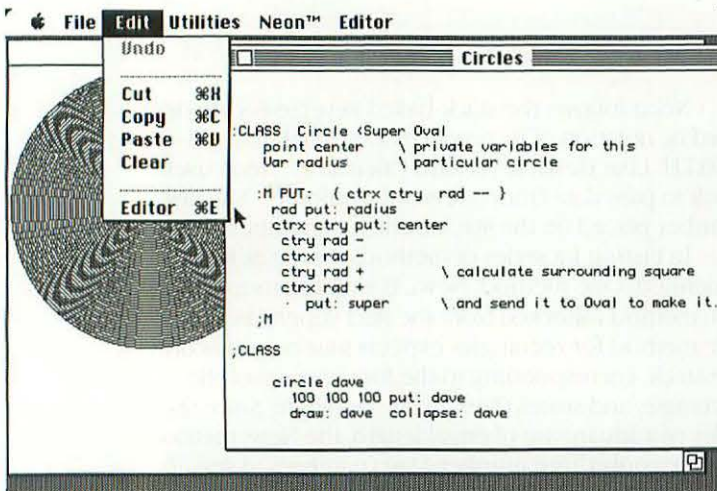


Figure 2

A new class is defined for *Circle*, a subclass of *Ovals*. Following the definition, an instance called *Dave* of the class *Circle* is created, and a draw: message tells the circle to draw itself. The collapse: message creates the concentric rings shown in the background.

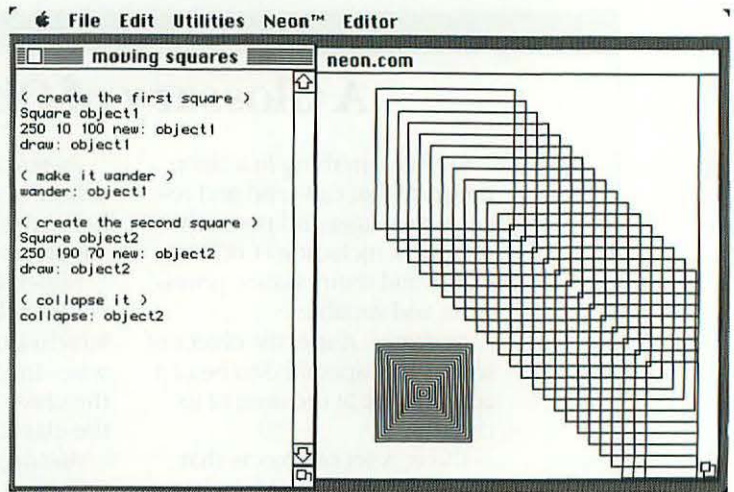


Figure 3

Two objects of class *Square* are created with the names *Object1* and *Object2*. A draw: message followed by wander: is sent to *Object1*, resulting in the cascade of squares. A draw: message followed by collapse: is sent to *Object2*, resulting in the concentric squares.

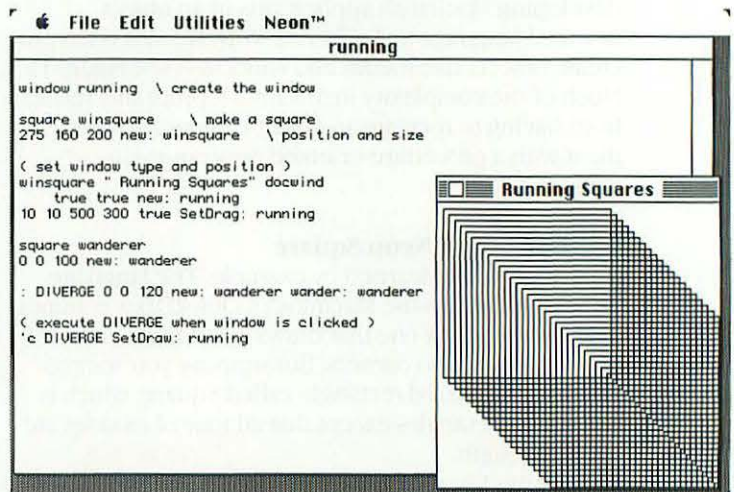


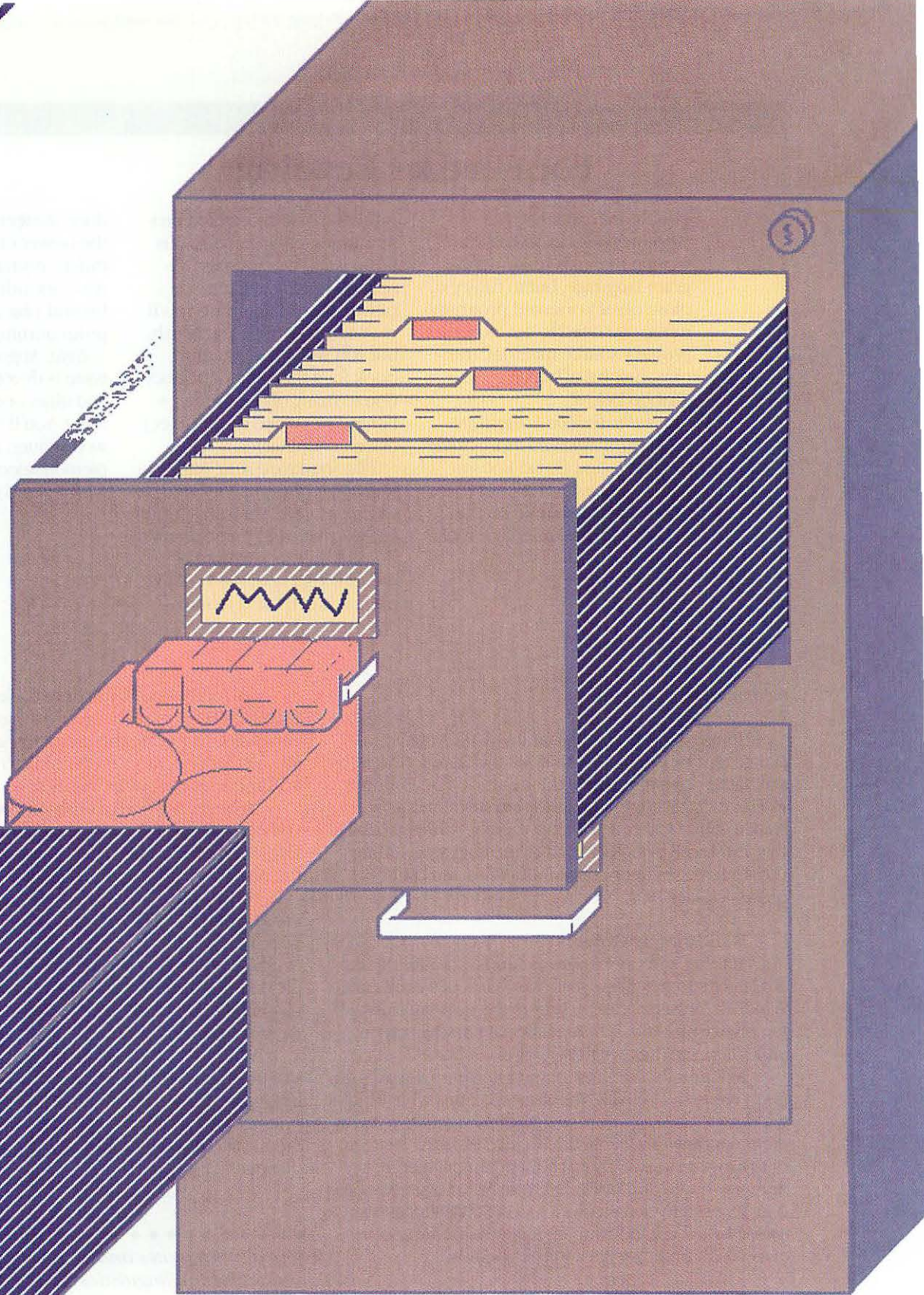
Figure 4

A window is created by first creating an instance of class *Window*. The window parameters, which include the window's boundary, title, type, and whether it is visible and has a close box, are placed on the stack prior to sending the new: message. SetDrag: sets the limits within which the window can be dragged. In this example, *Diverge* creates the cascading pattern each time you click in the window.

Byte, August 1981. The entire issue is devoted to Smalltalk and object-oriented programming. You'll find helpful and well-written articles on the implementation of Smalltalk, from which Neon is derived.

Macworld 93

Look into the second generation of Macintosh database managers for file security, relational capability, and other features meant for serious business.



Data That Means Business

Jim Heid

A nightmare that haunts executives is a vision of records so tangled and useless that business comes to a standstill. Key decisions often require timely and well-managed information. In fact, the records a company keeps are often as valuable to its operation as the products or services it offers.

With so much at stake, businesspeople have learned the need for powerful data management tools. While any database manager can store and retrieve information, people with complex data management tasks or confidential data to store require programs with special capabilities. Several database programs have been available for the Macintosh since last year (see "Covering All the Bases," *Macworld*, January 1985), but the powerful data management programs that many businesses need have become available only this spring.

Omnis 2, *Keystroke*, and *MacLion* do more than let you store, sort, and print records. These database managers have sophisticated features, such as passwords, automatic entry, and file conversion, that let you create powerful and flexible databases. The programs are suited to serious business applications such as accounting, inventory, and personnel.

All three programs let you preset the contents of a field. For example, if most employees in a company live in the same state, a field preset (also called a default) could be used in a personnel database to automatically supply the state's abbreviation, eliminating the need to type it in each record.

The information-checking capabilities of *Keystroke* and *MacLion* help ensure the accuracy of a database. The programs let you specify a value or a range of values against which the program checks entered data. In a payroll database, for example, information checking could prevent you from entering salary figures beyond a certain range.

A security feature provided by *Omnis 2* and *Keystroke* lets you assign passwords to a database or to certain fields to keep roving eyes from sensitive information. A personnel director, for example, might use passwords to prevent unauthorized employees from uncovering payroll information.


Keystroke and *MacLion* are relational database managers, which let you join separate but related files to create a database with information from both. For example, you could keep customers' names and addresses in one file and a list of their orders in another. At billing time the relational data manager could combine the two files to print addressed invoices for each customer.

Finally, no program should make you retype information stored elsewhere. *Omnis 2* and *Keystroke* use documents created by other programs, such as *Multiplan* and *Microsoft Word*, and create documents that other programs can open. As information management products increase in number, the ability to share data becomes increasingly important.

Whether you need all the features of these three programs depends on your work. To help you decide, the table "Database Roster" shows the vital statistics of the three products and of other available database managers. Other Mac database managers are available or in development. One new program, Odesta's *Helix*, is a relational database manager for the 512K Macintosh that makes extensive use of icons.

Omnis 2

When it was first released, Organizational Software's *Omnis 2* was criticized for not taking advantage of pull-down menus, the mouse, and other facets of the Macintosh interface. Since then the company has released a revised version that takes advantage of the Mac's attributes. The new version of *Omnis 2* isn't relational, but it provides password protection, preset fields, information checking, and file conversion.

 *Omnis 3 lets you customize data management applications with your own pull-down menus and dialog boxes.*

Omnis 2 deals with a database in two parts: the library, which contains the names, lengths, and types of all the fields, and the data entries themselves. The separation of design and data lets you use one library for several databases.

Besides the usual text, date, and numeric field types, *Omnis 2* provides calculated fields and Boolean fields (see Figure 1). Calculated fields contain the results of calculations involving values from other fields, such as a Net Income field that subtracts an Expenses field from a Gross Income field. Boolean fields store either of two values: yes or no. A Boolean field called Past Due, for example, would indicate whether or not a customer's account is paid.

When you design a database in *Omnis 2*, you position a new field by clicking where you want it. You can't drag a field to another position, however; you have to cut and paste it.

Data Entry and Retrieval

After you design a database, you enter and view data in a window using a set of command buttons to the right of the vertical scroll bar (see Figure 2). You have to click the Insert button each time you enter a new record; *Omnis 2* lacks a keyboard shortcut for the Insert command that would speed up long data-entry sessions.

After you finish entering data, you can browse through the database with the Next and Prev buttons. Records are displayed in sorting order but with no in-

dication of a record's position in the database. The program should use a record scroll bar or display the record number to show your location in a database.

You can also search for a specific record based on field criteria or for sets of records based on up to 50 criteria. By storing search criteria you can repeat a complex search in one step without reissuing a chain of commands.

The program's multiple update capability helps make substantial changes to a database. For example, if your company changes the name of its engineering department to "Design and Engineering," you could update your personnel database by changing all occurrences of "Engineering" to "Design and Engineering." This feature makes *Omnis 2* suitable for large databases that require frequent updates.

Reports

Adequate for most tabular printouts, *Omnis 2*'s only noteworthy reporting capability is designing wide reports. The program can generate reports up to 240 characters wide—a valuable feature for owners of printers with 15-inch carriages. *Omnis 2* can print mailing labels up to three across.

Besides its own storage format, *Omnis 2* can open and save databases in data interchange format (DIF), allowing you to exchange data with other programs such as *Keystroke* and even *1-2-3* for the IBM PC. The program can also create text-only files, allowing you to transfer data between *Omnis 2* and programs such as *Microsoft File* or *Word*.

Most important, *Omnis 2* data files can be used with *Omnis 3*, a relational database manager still in development at this writing. A prerelease version of *Omnis 3* that I saw lets you customize data management applications with your own pull-down menus and dialog boxes and allows you to access files created by other programs (see Figure 3). Up to 40 people can use the program simultaneously through the AppleTalk network. Because the two programs are compatible, one department of a company could use *Omnis 2* for simple databases, such as client directories, while another department could use *Omnis 3* for complex, relational databases that could access the first department's *Omnis 2* files.

The improved *Omnis 2* still isn't a four-star database manager. It has a few shortcomings: a lack of keyboard command shortcuts, no on-line help, and a confusing manual. But enough features make it worth considering, especially if you pair it with *Omnis 3*'s relational capabilities.

The dialog box is titled "Field description". It contains the following information:

- Number: 6
- Name: COST
- Field length: 9
- Dec places: 2

On the left, there are radio buttons for field types: Character, **Numeric**, Boolean, Date, and Sequence. The "Numeric" option is selected.

In the center, under "Field attributes", there are checkboxes:

- Indexed (unchecked)
- Unique ind. (unchecked)
- Calculated (unchecked)
- Upper case only (unchecked)
- Negatives allowed (unchecked)
- Zero shown empty (unchecked)
- Delete protected (unchecked)

On the right, under "Justification", there are radio buttons: **Left**, Right, and Center. The "Left" option is selected.

At the bottom, there is a text field labeled "Default:check" containing the value: '2500':(COST>999)&(COST<1999). Below this are three buttons: Delete, Cancel, and OK.

Figure 1

In *Omnis 2* you set a field's characteristics in the Field Description window. The numeric field called *COST* has a preset value of 2500 and must contain values of between 2000 and 3000, as indicated on the "Default:check" line.

The screenshot shows the "Database EMPLOY Screen 1" window. The title bar includes "File Edit Options Enter & retrieve data". The main area displays the following information:

CONSOLIDATED CORPORATION
Personnel Department

Name: Duncan Kelly
Address: 27450 Southern Blvd.
City: Los Angeles
State: CA Zip: [redacted]
Phone: [redacted]
Employee number: 0

Date Hired: [redacted]
Starting pay: 0
Supervisor: [redacted]

On the right side, there is a vertical column of buttons: Next, Prev, Find, **Insert**, Edit, Delete, Print, OK, and Cancel. The "Insert" button is highlighted.

Figure 2

In this *Omnis 2* database, "Los Angeles" and "CA" were specified as field presets—values that the program provides automatically. To override a preset, you type over the preset text, which is already selected when the record appears on the screen.

Database Roster

A comparison of the features and capabilities of the three programs reviewed here and several other Macintosh database managers. The form design method indicates a program's flexibility in letting you design forms for data entry: fixed means that the form is preset and can't be changed; free means that you can position fields anywhere but can't change their font style or size unless the table says free with fonts.

Database Roster

	1st BASE	pfs:file pfs:report	DB Master	Main St. Filer	OverVUE
Data Entry, File Management					
Maximum field length	50	60 ¹	3000	40	62
Maximum fields per record	100	3100 ¹	100	36	64
Maximum record length	5000	50,048 ¹	3000	1440	3968
Maximum records per file	disk	2900 ¹	disk ²	65,000	RAM
Relational	yes	no	no	no	yes
Entry checking	no	no	no	no	yes
Field presets	no	no	no	no	yes
Computed fields per record	25	none	20	none	64
Form design method	fixed	free	free with fonts	fixed	free
Report Generation					
Maximum sorting levels	10	2	10	2	unlimited ³
Computed fields in reports	yes	yes	yes	no	no
Field totals	yes	yes	yes	yes	yes
Field averages	yes	yes	no	no	yes
Record count	yes	yes	yes	no	yes
Report destinations (Screen, Printer, Disk file)	S, P, D	S, P, D	S, P, D	S, P	P
Headers	no	yes	yes	yes	yes
Footers	no	no	no	no	yes
Print quality (Draft, Standard, High)	D	D ¹	D, S, H ²	D, S, H	D
Save report designs	no	yes	yes	yes	yes

¹**pfs:file, pfs:report.** Theoretically, field length is unlimited, although the practical limit is around 60 characters because the programs cannot wrap words in long text fields. While technically correct, the maximum number of fields per record and the maximum record length each imposes an impractical minimum on the other. The programs handle up to 32,000 records on a hard disk.

When you print, the programs let you send control characters to specify the ImageWriter's built-in fonts but not Macintosh fonts, such as Geneva, Chicago, or New York. Although once available for purchase separately, pfs:file and pfs:report are now sold as a package, and the table treats them accordingly.

²**DB Master.** A database can be contained on up to 44 floppy disks; on a hard disk the limit is 17.6 megabytes. The programs can use LaserWriter fonts.

³**OverVUE.** Sorts on one field at a time but allows sorts on consecutive fields while maintaining previous sort order.

Keystroke

Keystroke is a relational data manager from Brock Software that takes data security seriously. It scrambles files into seemingly random strings of characters, decoding them only when you provide the correct password. File scrambling is more secure than password-only schemes, which can be circumvented with a simple BASIC or file-editing program that can be written by almost any knowledgeable programmer. *Keystroke*'s maximum security makes it worth considering if you have sensitive data to manage.

The release version of *Keystroke* that I used had several bugs that shook my confidence in an otherwise well-designed program. While none of the problems I encountered resulted in a loss of data, I don't recommend creating a large database with the program.

Data Entry and Retrieval

Designing a database in *Keystroke* involves typing field names and choosing commands from the Enhance menu to specify the characteristics of each field. You position fields not by dragging them but by adding or removing carriage returns and spaces. You can also cut and paste fields to move them around, but beware of the Undo command; when I chose it while designing a database, the program suffered a stroke, so to speak, requiring me to restart the Mac.

You move from field to field as you enter data by using the Tab key or clicking scroll arrows. *Keystroke*'s scroll bars are narrower than those in most Mac applications; you need to be precise in your mouse movements (see Figure 4).

Keystroke's scroll bars also behave rather unusually. When you're viewing the first record in a database, the horizontal scroll box appears near the middle of the scroll bar instead of at the left edge. If you drag the scroll box to the far left, it pops back toward the middle again.

According to *Keystroke* product designers, this quirk isn't a bug. They explained that in a database containing only one record, the scroll box appears in the middle. When you add a record, *Keystroke* divides the scroll bar once again and moves the scroll box to the middle of the left half. Every record you add divides the scroll bar again. Once the technique was explained to me, the scroll box's behavior made sense. Still, it contradicts standard Macintosh scrolling tech-

Omnis 2	Keystroke (128K/512K)	MacLion	Microsoft File
60	60	255	32,767
120	50/255	25	1023
7200	2048/4096	6375	32,767
disk	disk	disk	65,535
no	yes	yes	no
yes	no	yes	no
yes	yes	yes	no
60	49/254	25	1023
free	free	free	free with fonts
9	4	13	10
yes	yes	yes	no
yes	yes	yes	yes
no	yes	no	yes
no	yes	yes ⁵	yes
S, P, D	S, P, D	S, P, D ⁵	S, P
yes	yes	yes	yes
no	yes	no	yes
D ⁴	D	D	D, S, H
yes	yes	yes	yes

⁴**Omnis 2.** Lets you use control codes to select the Imagewriter's built-in fonts but not the Macintosh's fonts.

⁵**MacLion.** Programming in Leo is required for a record count and to send reports to the screen, the printer, and the disk.

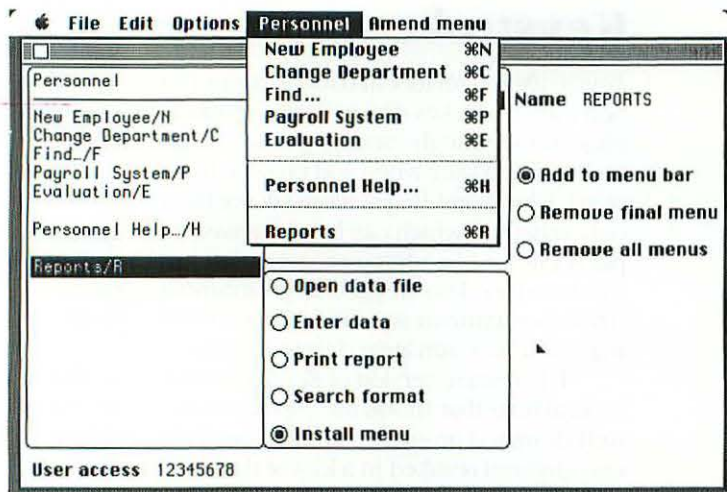


Figure 3

Omnis 3 lets you create data management applications that have menus. This figure shows the creation of a menu for a personnel management application. The left side of the screen lists the menu's commands and keyboard shortcuts.

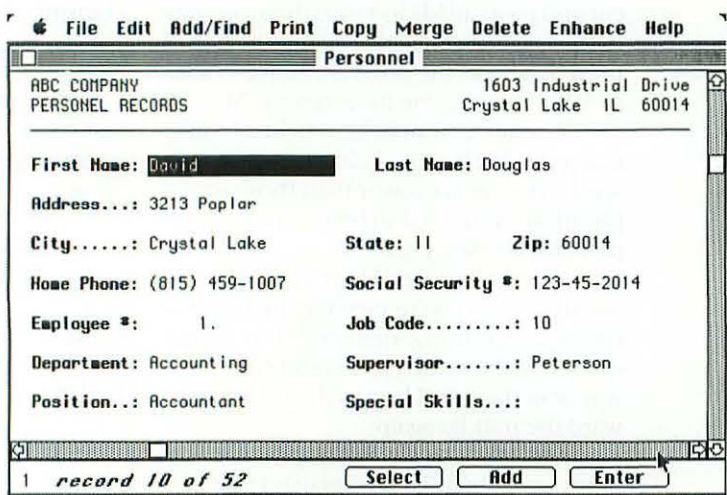


Figure 4

You browse through a Keystroke database with the horizontal scroll bar. Within a record you move from field to field either by clicking the desired field, pressing the Tab key, or clicking the vertical scroll arrows. Keystroke's oddly shaped arrows are smaller than those in most Mac programs and require precise pointer positioning.

niques. The scroll box is confusing because when you move it to a given point, you expect it to stay there and not jump to another spot.

You locate specific records using a full complement of search characters, such as greater-than (>) and less-than (<) symbols and equal signs (=), and you can save search specifications for later use. Like *Omnis 2*, *Keystroke* lets you update an entire set of records at once, eliminating the need to locate and change each one.

Reports

Keystroke produces the kinds of reports required by most businesses. It also has the ability to generate form letters that merge information from a database, such as names and addresses, with text written in *MacWrite*. You indicate where you want a specific field to appear in the letter by enclosing it in braces. A letter that begins *Dear {{name}}*, for example, causes *Keystroke* to insert the contents of the Name field in each letter.

To create tabular reports, you indicate which fields you want to appear in which columns. You can print out summary information, such as totals and averages. You can also print records that meet certain conditions, such as a past due account or a sales figure that exceeds a person's quota, in bold type.

Keystroke strikes me as a good product that was released prematurely. Brock Software is aware of the bugs in the program's first release; chances are the problems will be corrected by the time you read this. When they are, *Keystroke* will most likely take its place as one of the better Macintosh data managers.

MacLion


MacLion is a multirelational database manager that can join and work with up to 14 files at once, instead of only 2. An accounting application, for example, could coordinate databases for accounts receivable, accounts payable, general ledger, inventory, and client directory. A change in one database, such as a new order from a client, causes corresponding changes in the others. With this capability, *MacLion* is suited to joining and reorganizing related information stored in a number of databases.

One way I judge a program's simplicity is to begin using it without referring to the documentation. When I tried this approach with *MacLion*, I felt as if I'd been

given the controls to the space shuttle and told to parallel park it on Fifth Avenue. And as I worked through the manual, the traffic was slow in clearing. *MacLion* is a powerful program, able to go head-to-head with any database manager running on any personal computer. It's also difficult to use and in many ways doesn't live up to Macintosh software standards.

Leo the Lion

MacLion has seven main sections, such as Query, Program, and Reports, that you select as commands from the Lion menu, which lets you perform tasks such as data entry, reporting, and programming. The

 *MacLion can join and work with up to 14 files at once.*

Query command lets you view your database and add new records. The Define command lets you design new databases and change fields in existing ones. The Screens command lets you customize data-entry screens and specify entry-checking criteria for various fields. The Reports command gives you control over *MacLion*'s report-generating features.

The Editor and Program commands provide access to Leo, *MacLion*'s built-in programming language. When you create a data-entry screen or design a report, *MacLion* translates your specifications into a Leo program, which you can modify with *MacLion*'s text editor. Advanced programmers can use Leo to create data-entry screens containing buttons such as New, Add, and Quit, write complex report-generating programs, and convert files created by other applications. Unfortunately, writing a Leo program is the only way to get data from other programs into *MacLion*, which has no built-in data transfer commands.

Leo resembles the FORTH programming language (see "The MacFORTH Dimension," *Macworld*, November 1984). Like FORTH, Leo uses postfix notation, a method of expressing equations in which arguments are followed by operators. For example, the expression $2 + 2$ is written as $2\ 2\ +$ in Leo. FORTH programmers should feel at home with Leo; those of us accustomed to arithmetical notation, however, need to adjust. It's important to note that you can use most of *MacLion*'s capabilities without ever having to program in Leo, which is for people who want greater control over *MacLion*'s data-entry screens and reports.

Entering and Retrieving

MacLion lets you enter data in one of two ways. You can use the program's Query command for quick data entry, or you can design your own data-entry screen with the Screens command (see Figure 5). When you use the Query command, *MacLion* presents a rather cryptic display that blatantly ignores everything that makes Macintosh software unique (see Figure 6). For example, concluding data entry requires you to type a slash (/) rather than choose a Stop command or click a Stop button. In my opinion, Macintosh application programs shouldn't make you type anything but data. If a program breaks this rule, it should make you type only familiar words like "stop" or "done." It certainly shouldn't make you type anything as arbitrary as a slash.

Violations and Manual Labor

MacLion flies in the interface of Macintosh software design in other respects as well. The Clipboard, for example, is hardly used. Since the Leo text editor is the only portion of the program with an Edit menu, you can't cut and paste text during data entry or report design. *MacLion* has an Apple menu, which in other programs usually contains desk accessories, but the only choice on the menu is About *MacLion*.

When I pointed out *MacLion*'s shortcomings to its designers, they explained that their first priority was to create a powerful database manager that runs on a 128K Macintosh. To me, their reasoning led to the development of a program that is like a high-performance car with no seats—it can outrun the competition, but it isn't very comfortable.

MacLion's documentation could also use some improvement, especially since the program is difficult to figure out. The user guide introduces you to parts of the program as you work on a sample database. Unfortunately, the guide is illogically organized, teaching complex tasks such as report design before tackling basic chores such as structuring a database. The reference manual does a fair job of teaching Leo programming, but both it and the user guide suffer from distracting puns about lions and jungles—perhaps the writers didn't realize that lions don't live in the jungle.

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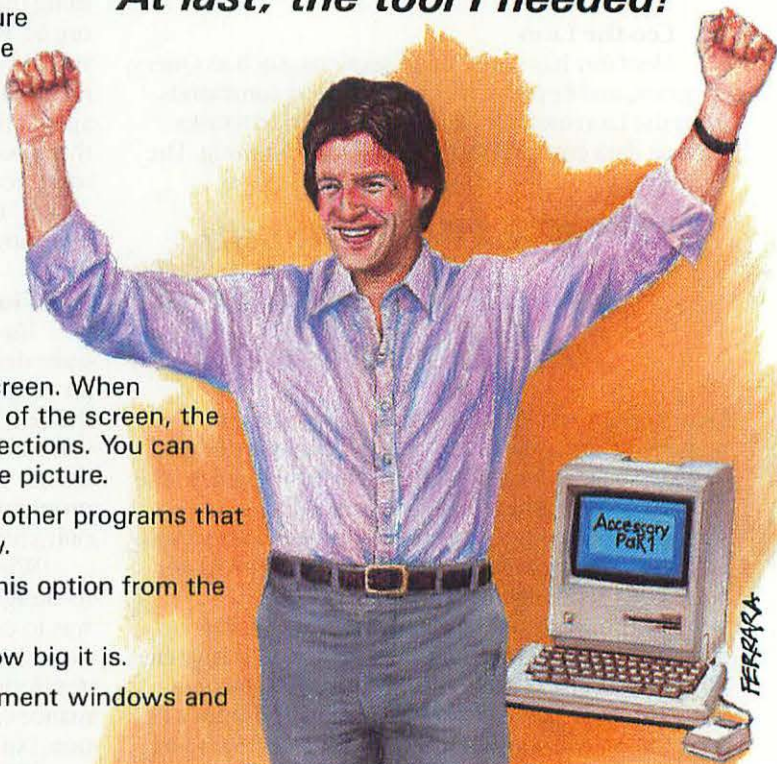
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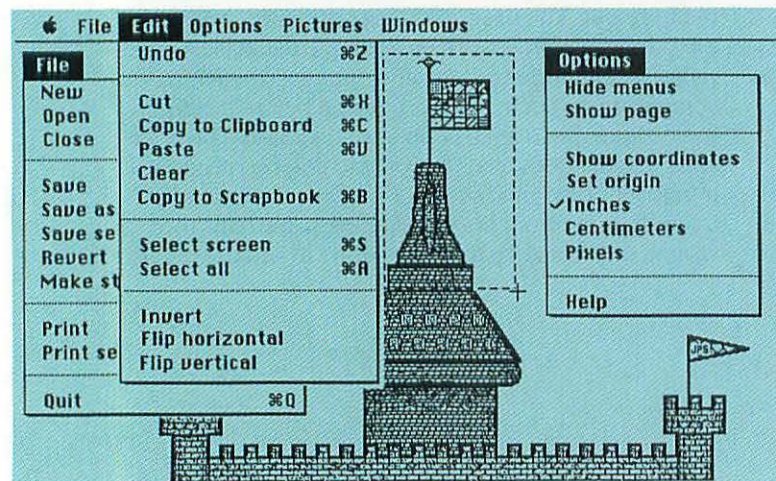
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Figure 5

MacLion's Screen command lets you create data-entry screens that have buttons such as Add, Delete, Next, and Last. You can't cut and paste text during data entry, however, because that portion of the program lacks an Edit menu.

```

KEY is required
CLI.ABBRU , T , 7 : JSERU
CLIENT , T , 35 : Joe's Service Company
ADDRESS , T , 30 : 507 First Street
CITY , T , 15 : Pittsburgh
STATE , T , 2 : PA
S.ZIP , T , 5 : 15222
PHONE , T , 12 : 412-555-5578
ORDER.NO , I , 4 : 554
S.AMOUNT , .2, 9 : 5.50
S.BALANCE , .2, 9 : _
  
```

Figure 6

When you add records using MacLion's Query command, the program displays this cryptic screen. The characters and numbers that follow the field names indicate each field's characteristics, such as T for text or I for integer. When you finish adding records, you have to type a slash (/).

It's a shame that *MacLion* is so difficult to understand and use, because somewhere beneath the slashes and the puns lies a powerful database manager. Computer Software Design says it's working on a 512K-only version of *MacLion* that will provide access to Macintosh fonts and let you create applications with your own menus. I hope the 512K version will also be easier to use. If your data-management tasks require *MacLion*'s power, consider *Helix* first or wait for *Omnis 3*. I can't recommend *MacLion* in its present form unless you need a powerful database and don't mind a user interface that neglects the Mac's attributes.

The Next Wave

Despite the increased power and performance of these three data managers, room for improvement still remains. The next Macintosh data managers should not only provide entry checking, field presets, security, file exchange, and relational capabilities but should also let you use fonts and store graphic images as well as text. The ultimate data manager will combine *Microsoft File*'s ease of use and picture fields, *Omnis 3*'s pull-down menus, and *MacLion*'s data-management power. Only then will the Macintosh have a database manager that takes full advantage of the computer's power, appealing graphics, and intuitive user interface. □

▲▲▲▲▲▲▲▲▲▲ Jim Heid is a
Contributing Editor of Macworld.

Omnis 2
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Keystroke
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Crystal Lake, IL 60014
815/459-4210
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Income producing real estate	95.
On Schedule	130.
Tax Shelter Syndication Analysis	195.

Software Publishing

PFS:File	72.
PFS:Report	72.
PFS:File/Report	115.

State of the Art

Electric Checkbook	49.
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Stoneware

DB Master	115.
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T/Maker

Click Art Personal Graphics	30.
Click Art Publications	30.
Click Art Letters	30.
Click Art Effects	30.
ClickOn Worksheet	47.

Telos Software

Filevision	99.
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Think Educational

Mind Over Mac	31.
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Five challenging games.

MacEdge	31.
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Learning programs in math and reading.

Vindex

MacCalendar	53.
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Includes a reminder system to alert you of important messages or notes.

Warner Software

The Desk Organizer	69.
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TRAINING

ATI

MacCoach Training	\$45.
Teach Yourself Multiplan	32.

Forethought

Typing Intrigue	31.
<i>Typing instruction that features solving a mystery case.</i>	

Palantir

MacType	31.
<i>Supports Qwerty and Dvorak keyboards.</i>	

MathFlash	31.
-----------------	-----

Math flash card drills.

Scarborough Systems

Mastertype	29.
<i>Typing program with arcade action.</i>	

Simon & Schuster

Typing Tutor III	31.
<i>Includes Letter Invaders.</i>	

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- Allow 1 week for personal & company checks to clear.
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- COD max. \$1000. Cash or certified check.
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- To order, call us anytime Monday thru Friday 9:00 to 9:00, Saturday 9:00 to 5:30. You can call our business offices at 603/446-7711.

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Axlon

MacMatch	\$31.
<i>Match the squares and solve the hidden puzzles underneath.</i>	

Blue Chip

Millionaire (stock market)	37.
Tycoon (commodities)	37.
Baron (real estate)	37.

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Think Fast	29.
<i>Improve your memory.</i>	

Chipwits	31.
<i>Create your own robot. No programming knowledge required.</i>	

TeleChess	41.
<i>Play chess over the phone. Modem required.</i>	

Broderbund Software

Lode Runner	26.
<i>Arcade style; attempt to recover stolen gold.</i>	

Cyborg	26.
<i>A sci-fi text adventure.</i>	

CBS

Murder by the Dozen	29.
<i>12 intricate mysteries.</i>	

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Ground Zero	26.
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<i>Turn your favorite drawings into a jigsaw puzzle.</i>	

Word Challenge II	24.
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Sargon III	31.
<i>The ultimate in computer chess.</i>	

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You're a magician challenging the dungeon master, a detective solving a murder mystery, a scientist deciphering hieroglyphics, or just an ordinary mortal meeting the Wizard of Frobozz. (Difficulty levels shown in parenthesis)

Seastalker (junior)	25.
Enchanter (standard)	25.
the Witness (standard)	25.
Planetfall (standard)	25.
Cutthroats (standard)	25.
Hitchhiker's Guide (standard)	25.
Zork I (standard)	25.
Zork II (advanced)	29.
Zork III (advanced)	29.
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Suspect (advanced)	29.
Sorcerer (advanced)	29.
Deadline (expert)	31.

1-800/Mac&Lisa

490C

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*Defective software replaced immediately. Defective hardware replaced or repaired at our discretion. Some items have warranties up to five years.

Circle 4 on reader service card



In Search of a Better Mouse

Gordon McComb

Before the Macintosh, mice were regarded with disdain by most personal computer veterans. "If God had intended us to use mice," a friend once told me, "he would have given us three hands." Good point, but one that many people today are disregarding. More and more of us are using mice and liking it.

the Mac.

Starcross (expert)	\$31.
Suspended (expert)	31.
Invisicues (hint booklets) are available for any Infocom games. Specify game.	7.
Mark of the Unicorn	
Mouse Stampede	23.
<i>Highly addictive.</i>	
McCarron-Dial Systems	
McFlip	21.
<i>Mac version of Reversi.</i>	
McTrivia	24.
<i>Animated trivia game.</i>	
Miles Computing	
MacAttack	29.
<i>3-dimensional tank simulation.</i>	
Mirage	
Trivia (new low price)	19.
Penguin	
Transylvania	24.
The Quest	24.
Pensate	24.
<i>You can control the obstacles, but can you make it to the top of the grid?</i>	
Priority Software	
Forbidden Quest	27.
<i>A truly challenging sci-fi adventure.</i>	
Gateway	29.
<i>Sci-fi fantasy adventure.</i>	
Scarborough Systems	
Run for the Money	32.
<i>Best with 2 players.</i>	
Make Millions	32.
<i>Enter the world of high finance.</i>	
Screenplay	
Trivia Arcade	27.
<i>Sports, music, TV, science, and general.</i>	
Sierra On-Line	
Frogger	27.
Ultima II	37.
<i>The ultimate fantasy role-playing adventure.</i>	
Silicon Beach Software	
Airborne!	21.
<i>Works with either 128k or 512k Mac.</i>	
Soft-Life Corp.	
Mac-Slots	29.
<i>An electronic slot machine. Includes Keno.</i>	
Videx	
Collection of familiar, entertaining, and challenging games.	
Funpak	23.
MacCheckers/Reversi	29.
MacGammon/Cribbage	29.
MacVegas	35.

HARDWARE

Assimilation	
Mac Daisywheel Connection	75.
Mac Turbo-Touch	89.
Compucable	
Mac to Hayes Smartmodem cable	17.
Mac to Epson FX/RX printer cable	17.
Cuesta Systems	
Datasaver AC Power Backup	call
<i>Keeps Mac operating during line power interruptions or brownouts. 90 watts.</i>	

Curtis Manufacturing

SURGE SUPPRESSORS

All surge suppressors have an on/off switch.	
Diamond (6 outlets)	\$33.
Emerald (6 outlets; 6 ft cord)	43.
Sapphire (3 outlets; EMI/RFI filtered) ...	53.
Ruby (6 outlets; EMI/RFI filtered; 6 ft cord) 63.	

Epson

All Epson printers have built in graphics capability. In addition, the "Plus" printers can print in near letter quality (NLQ) with the addition of the NLQ parallel or serial option.

RX-100	call
FX-80 Plus	call
FX-100 Plus	call
JX-80	call
LQ-1500 (letter quality dot matrix)	call

Hayes Microcomputing

Smartmodem 300	call
Smartmodem 1200	call
Compucable's Mac to Smartmodem cable 17.	

IOMEGA

Bernoulli Box	1397.
<i>5-megabyte storage for your Mac.</i>	

5-meg Cartridge	39.
Head Cleaning Kit	69.

Kensington

Mac Dust Cover	10.
Imagewriter Cover	10.
Universal Printer Stand	17.
Swivel	21.
Disk Case (holds 36 Mac disks)	21.
Surge Suppressor	34.
Starter Pack	54.
Control Center	65.
Modem (300 baud)	95.

Koala Technologies

MacVision	179.
<i>Digitize pictures or objects for reports, projects for use with video camera or other video source.</i>	

Microcom

MacModem	399.
<i>Upgradeable to 2400 baud.</i>	

Microsoft

MacEnhancer	165.
<i>Additional ports and terminal software.</i>	

Suprex Business Software

MacSpeak	15.
<i>External speaker for your Mac.</i>	

DISKS

Innovative	
Flip & File (Holds 40 Mac disks)	23.
Pacific Wave	
Flip Sort Micro (Holds 40 Mac disks) ...	12.
BASF 3 1/2" Disks (Box of 5)	18.
Verbatim 3 1/2" Disks (Box of 10)	28.
Sony 3 1/2" Disks (Box of 10)	31.
Fuji 3 1/2" Disks (Box of 10)	31.
Memorex 3 1/2" Disks (Box of 10)	31.
MAXELL 3 1/2" Disks (Box of 10)	31.
3M 3 1/2" Disks (Box of 10)	35.

INFORMATION SERVICES

Compuserve

Compuserve Information Service	19.
<i>Includes subscription, manual, 5 hours of connect time, and monthly publications.</i>	

Source Telecomputing

The Source (subscription & Manual) ...	39.
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MISCELLANEOUS

American Tourister

Mac Carrying Case (designed to carry the Mac, external drive, mouse, keyboard, disks & manuals)	\$49.
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Automation Facilities

Floppicle (ten cleaning disks)	25.
Refill Kit (ten disks)	10.

Computer Coverup

Mac & Keyboard (two covers)	10.
Imagewriter Cover	8.
Wide Imagewriter Cover	8.
External Disk Drive Cover	4.

Diversions

ColorPack	19.
<i>Includes one black ribbon and set of five color pens.</i>	
Underware Color Pens	11.
<i>Add colors to your iron-on transfers.</i>	

I/O Design

Imagewriter Transfer Ribbons	10.
<i>Available in black, red, blue and yellow.</i>	
Imageware	49.
<i>Padded Imagewriter Carrying Case with shoulder strap. Navy blue.</i>	
Macinware	69.
<i>Sturdy well-padded bag for the Mac, mouse, drive, keyboard, and accessories. Reinforced bottom.</i>	

Innovative Technologies

CompuBag	59.
<i>Well-padded carrying case for your Mac and accessories. Reinforced bottom. Available in navy, burgundy, and silver-grey.</i>	
The Easel	15.
<i>Folding diskette holder. Perfect companion with CompuBag, holds 20 disks.</i>	

Kalmar Designs

Roll-top teakwood disk case.	
<i>Holds 45 disks.</i>	
19.	

Microsoft Press

Microsoft Multiplan: Of Mice and Menus	13.
Inside MacPaint	14.
MacWork MacPlay	14.
The Apple Macintosh Book	14.
Presentation Graphics on Apple Mac ..	14.

Moustrak

Moustrak Pad	
<i>Reduces mouse wear, greater accuracy and speed. Available in brown, blue, red, brown, & green.</i>	

Standard 7"x 9" size	8.
Large 9" x 11" size	9.

RAEX Enterprises

Mouse-Trap	8.
<i>Convenient storage space for the mouse.</i>	

Ribbons Unlimited

Available in black, blue, brown, green, purple, red, and yellow.	
Imagewriter Ribbon	5.
Imagewriter Ribbons Six Pack	28.
Imagewriter Rainbow Six Pack	28.
<i>Includes each color except black.</i>	

Smith & Bellows

Brazilian mahogany disk case, made by New England craftsmen. Holds up to 90 disks.	19.
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The Ice Mac Cometh.



*"Ah, for just one time, I would take the Northwest Passage / To find the hand of Franklin reaching for the Beaufort Sea
Tracing one warm line through a land so wide and savage / And make a Northwest Passage to the sea."*

—Stan Rogers, Northwest Passage*

One hundred twenty-nine men sailed from England in May of 1845, under the command of Sir John Franklin. They were looking for a Northwest Passage through the Canadian High Arctic. All of them died. And to this day, no one is sure why.

Not only is their complete demise a puzzle, the mystery of their bizarre behavior before everyone perished remains unsolved. Why did the crew, as they staggered to their death, struggle to drag heavy loads of useless valuables in iron-shod sleds and boats? Why didn't the expedition leave reports in cairns, as required by the British admiralty?

Scientists still seek the answers. Was it scurvy, caused by their proper British aversion to eating blubber? Or were they slowly being poisoned by the lead soldering on their fancy new tin cans?

**Used with permission/Fogarty's Cove Music*

The mouse who stayed out in the cold. Last summer, a crew from the University of Alberta Anthropology Department, under the direction of Professor Owen Beattie, went to remote Beechey Island to dig up some clues. They brought along a Mac to sift through them.

The plan was to exhume the bodies of three sailors from the expedition whose graves were marked by solitary cairns. By taking small muscle, bone, and organ samples from the bodies, the scientists hoped to find some new answers.

As the crew picked away at the

frozen ground, their Mac picked away at the details of the excavation area—storing fieldnotes, cataloging, and mapping. The Mac was powered by car batteries (through an inverter), recharged by a 1500 watt gas generator. Neither freezing rain, sleet, hail, fog, or cold kept our mighty micro from its appointed tasks. And, according to our source, researcher Eric Damkjar, Mac even entertained the crew on those cold and lonely nights with Frogger and Transylvania.



This expedition was a success. After ten days they uncovered the perfectly preserved body of 20-year-old Chief Petty Officer John Torrington. It was an eerie moment. Even Mac stopped its incessant whirring for a moment of silence.

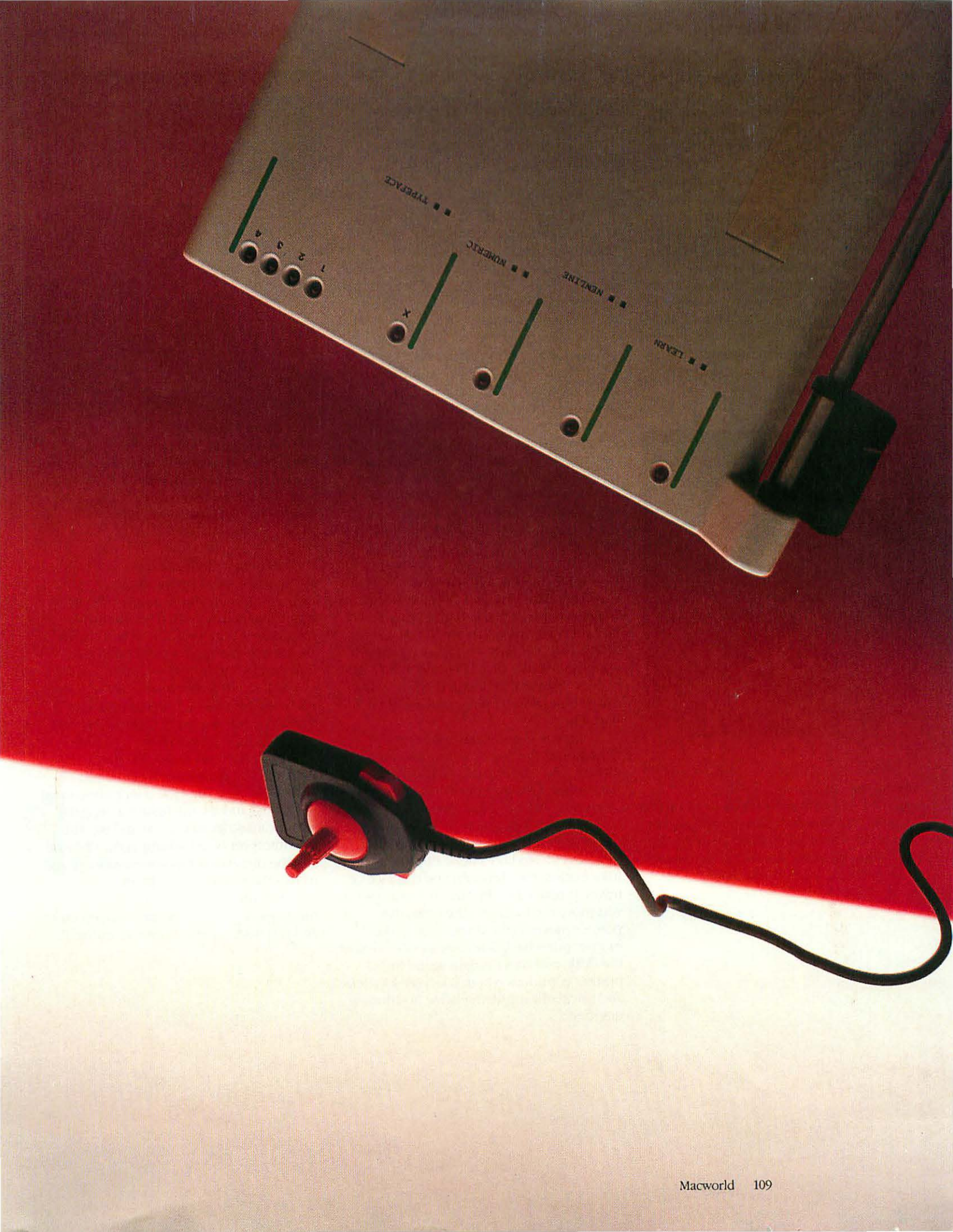
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While the Mac's mouse lets you draw pictures with *MacPaint* and move icons around the desktop, it's not the best tool for every job. Sometimes, when you're tracing the outline of a figure or playing an arcade game, the mouse just doesn't cut it. Either the mouse slips and slides uncontrollably around the tabletop, or it isn't responsive enough for precise work.

Good news is here. Several companies now offer worthwhile and ingenious alternatives to the Mac's mouse. Some are designed to replace the mouse, others to supplement it; all are useful in one way or another. What's available? Graphics tablets for drawing and tracing, trackballs and joysticks for playing arcade games, and optical character readers for entering previously typed text.



A+ Mouse

Optical mice, such as the A+ Mouse from Mouse Systems, contain no moving parts and don't require routine cleaning. You slide the mouse over the surface of a plastic pad containing a fine grid of lines.

I tried over a dozen input devices for the Mac and found that most of them do a remarkable job of making the Macintosh easier to use. But no single device is perfect in all instances. What's good for one job may not be suitable for another.

Types of Devices

Input devices for the Macintosh can be grouped into six main categories: replacement mice, trackballs, joysticks, graphics tablets, optical character readers, and bar-code readers. Many of the devices now available emulate the Mac's mouse; these usually hook up to the mouse port. The devices that don't act like the mouse are plugged into one of the serial ports.

Whatever input device you consider, test it thoroughly before buying. The usefulness of an input device is a subjective matter, and I found that it takes time to get used to each of the devices, to grow accustomed to the way it moves the pointer or interacts with the Mac. For instance, I found the trackball devices difficult to use. Yet I know of several people who swear by them and think my attitude toward them is all wet.

A Mouse for All Seasons

The mouse packed with the Macintosh is a hearty beast that will give you years of faithful companionship. But if you use the Mac a lot, especially with mouse-intensive applications like *MacPaint* and *MacDraw*, sooner or later you'll wear the little fellow out. It may take a couple of years, but it will happen.

You can buy a replacement mouse from Apple. But before you spend the money, take a look at the alternatives. All of them offer advantages over the standard Macintosh mouse; some are even cheaper.

The Mac's mouse is a relative positioning device. It doesn't matter where the mouse is located on a desk. Only relative information, the direction and distance of travel, is relayed to the Mac. For example, if you move the mouse to the right, the pointer moves right. If you pick up the mouse, put it back down on another area of the desk, and move it right again, the pointer continues where it left off. Joysticks and trackballs are also relative positioning devices.



Mac Turbo Touch

Assimilation's Mac Turbo Touch replaces the Mac's mouse. Instead of sliding a mouse around your desk, you roll the trackball with your fingers. The two buttons on either side of the trackball let you click and double-click.

To understand why some mice are better than others in a given situation, let's take a look at the Mac's mouse. The most important consideration is that the Mac's mouse is optomechanical. When you move the mouse around the desk, the rubber ball protruding from the mouse's underside spins. The ball moves a pair of rollers, each of which turns a shaft. At the end of the two shafts are disks, called light choppers, that have slits in them.

Light shines through the slits and is detected by light-sensitive phototransistors. Because the light choppers spin as the mouse moves, the light reaching the phototransistors flashes on and off. The Mac interprets the flashing as the distance and the direction of mouse movement and moves the pointer accordingly.

The main problem with optomechanical mice is that they pick up dust and dirt and require routine cleaning. If

you use a Mac in a dusty environment, such as a factory or a warehouse, it's not unusual to have to clean the mouse several times a week.

The alternative is a purely optical mouse, like the A+ Mouse from Mouse Systems. An optical mouse doesn't have a ball to turn or disks with slits. Instead the mouse glides over a special pad, a piece of flat plastic painted with a fine grid. A light-

Trackballs are ideally suited for fast and furious arcade games.

emitting diode inside the mouse shines a pinpoint of light on the pad. The light is then reflected back to a phototransistor in the mouse. The mouse detects movement as the light passes over the lines on the pad.

Because optical mice have no moving parts, they don't require routine cleaning. And because you use them with a plastic pad, they slide around more easily than their mechanical cousins. Still, optical mice aren't without their faults. First, the lines on the pad can be scraped off; the pointer skips when the mouse goes over damaged parts of the pad.

The second problem is that you must keep an optical mouse oriented parallel to the edges of the pad. If you change the orientation of the mouse on the pad, pointer movement is no longer consistent with mouse movement.

One of the newest wrinkles in optical mice for the Macintosh is the Hamster, a wireless mouse from the Kette Group. To use it you connect an included infrared receiver to the mouse port and slide the Hamster around the desk like any other mouse. Incidentally, the product is called Hamster because real hamsters, like wireless mice for the Macintosh, don't have tails.

Tracking Trackballs

Trackballs are nothing more than mice turned upside down. Instead of pushing a mouse around a tabletop, you spin a ball. One or two buttons on the top of the trackball let you click or double-click.

Trackballs are ideally suited for fast and furious arcade games such as *Mouse Stampede* and *Mac Attack*. They can also replace the Mac's mouse with other Macintosh applications. You can, for example, use a trackball with *MacPaint* or *MacDraw* and enjoy better than average results.

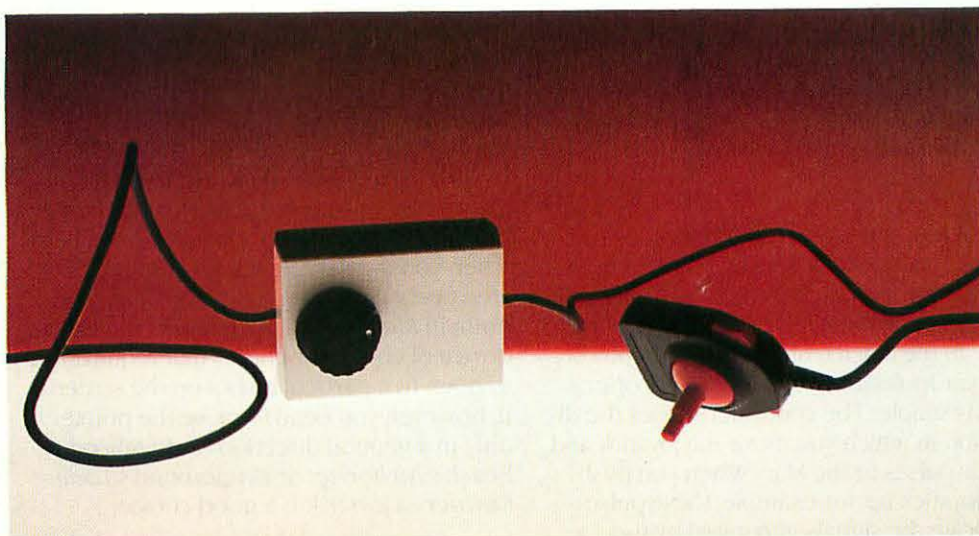
Trackballs for the Mac are being offered by several companies. One of the best built, albeit expensive, is Assimilation's Mac Turbo Touch. It's designed to sit to one side of the keyboard, though I found that I was most comfortable when I placed it in my lap. For added flexibility Mac Turbo Touch has an extra adapter for the mouse; you can easily alternate between trackball and mouse without connecting and reconnecting cables.

A trackball controller is available from the Kette Group. Like Mac Turbo Touch, the controller is attached to the mouse port.

Joy with Joysticks

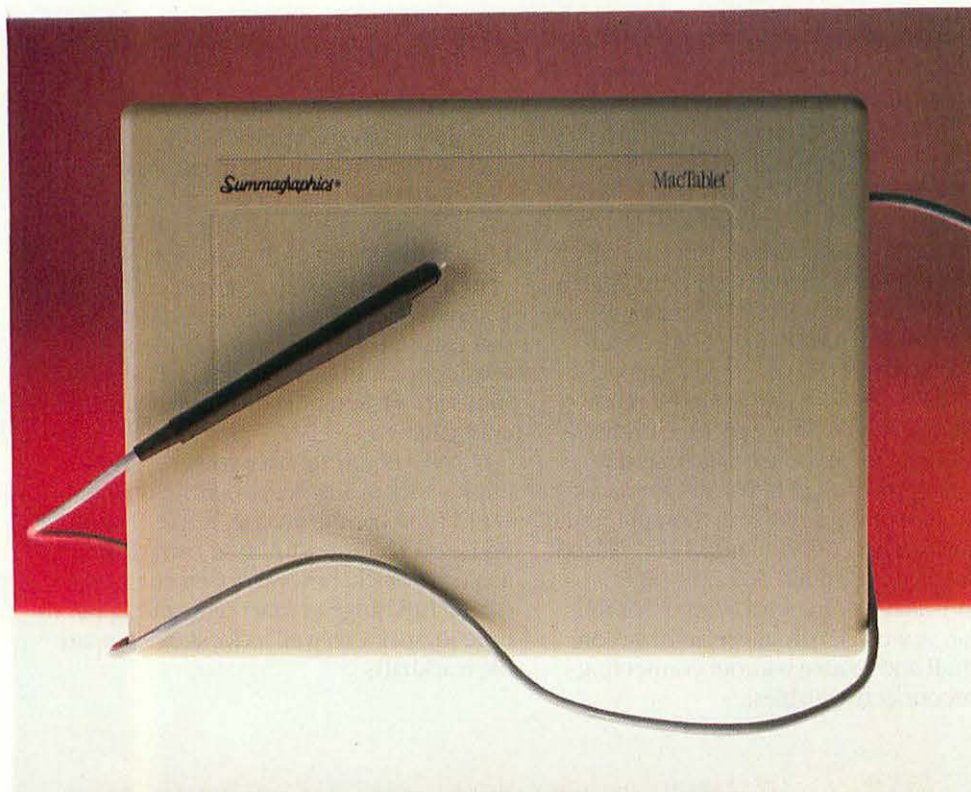
When I first started investigating input devices for the Mac, I was amazed that no joysticks were available. After all, you can find joysticks for nearly every personal computer. Fortunately, enough enterprising companies felt the same way I did, and now you can choose from many models. Most require a controller that is attached to the mouse port. You plug the joystick into the controller.

Most controllers let you use almost any joystick available, either the digital "Atari type" or the analog "Apple II type." Some even come with their own digital or analog joystick. Several dozen companies offer a full range of Atari-type and Apple II-type joysticks, as well as joystick-compatible trackballs.



MacNifty Joystick Controller

The Kette Group's MacNifty Joystick Controller connects to the mouse port and accepts either digital or analog joysticks.



MacTablet

Unlike other graphics tablets, MacTablet from Summagraphics attaches to the printer or modem port, allowing you to switch easily between the mouse and the graphics tablet.

A few of the controllers, such as the Video 7 MouseStick, let you connect both a mouse and a joystick at the same time. You can alternate between one and the other.

To the Macintosh the joystick/controller pair looks just like a mouse. Its operation is simple. The controller senses the direction in which you move the joystick and sends pulses to the Mac. When you push the joystick up, for example, these pulses replicate the signals generated by the mouse when you move it forward. Pulses are sent corresponding to each direction in which you move the joystick.

Most joystick controllers, including the Video 7 MouseStick and the MacNifty Controller from the Kette Group, come with a speed knob, which allows you to vary the rate of the pulses sent to the Mac. When

you turn the speed down and move the joystick, the pointer crawls at a snail's pace. Turn it up, and the pointer zips across the screen.

Joysticks generally work best with games. They aren't particularly suited for drawing in *MacPaint* though they can help when you draw straight lines, and they aren't very good for moving the insertion point in *MacWrite*. The mouse is the input device of choice for chores that require you to point to a particular spot on the screen. If, however, you need to move the pointer only in a general direction—as in Silicon Beach's *Airborne!* or Brøderbund's *Lode Runner*—a joystick is a good choice.

Graphics Tablets

Until recently programs that generate art have been limited to accepting commands from a keyboard or a pointing device such as a mouse or a joystick. No more. Graphics tablets, also called digitiz-

ing pads, have changed all that. With a digitizing pad in front of you and a stylus in your hand, you can doodle and sketch to your heart's content. The pad and stylus work like paper and pen.

Most graphics tablets work by means of minute pulses of electricity that course through a fine mesh of wire immediately beneath the surface of the pad. When you

You can enter a 20-page manuscript in about 5 minutes.

place the tip of the stylus on the pad, the stylus picks up the signals and converts them into pointer coordinates. Since the stylus can detect the electrical pulses through several thicknesses of paper, digitizing pads are ideal for tracing existing artwork in *MacPaint*.

Graphics tablets are usually absolute positioning devices. Like the Mac's mouse, graphics tablets tell the Mac which way to move the pointer. But unlike with the mouse, the spot you touch on the tablet determines the point on the screen where the pointer goes. Think of the surface of the tablet as the Mac's screen. When you touch the upper-right corner of the tablet with the drawing stylus, the pointer jumps to the corresponding spot on the screen. If you touch the center of the pad with the stylus, the pointer jumps to the center of the screen, no matter where the pointer was before.

Several graphics tablets are available for the Mac, including the Koala KAT, the Summagraphics MacTablet, and the GTCO Macintizer. Although all three tablets work in much the same way, there are a few marked differences among them.

The biggest difference is in the active drawing area, the part of the pad on which you sketch. KAT has the smallest—4 inches by 4 inches. The only tablet that senses relative position, it also has the smallest all-around dimensions—9¼ by 5½ by ¾ inches. Its size makes it ideal for small or cluttered desk tops.

MacTablet, about twice the size of the KAT, has an active drawing area of 9 by 6 inches. Macintizer, the biggest at 18 by 15½ by ½ inches, has an active drawing area of about 9 by 14 inches.

The size of the active drawing area is important, depending on the type of work you do. For simple freehand sketching, you can get by with a small active area. For tracing artwork or creating complex schematics or blueprints, you probably need something bigger. To aid in tracing oversize objects, Macintizer provides a 33 percent reduction mode, which neither MacTablet nor the KAT offers.

Another difference among the graphics tablets is the writing stylus. The Koala KAT, which responds to pressure on the pad, lets you draw with a variety of styli, including the plastic stylus that comes with the unit, a pencil, or even the tip of your finger. To simulate clicking, double-clicking, or holding down the mouse button,

you can either tap the button on the side of the stylus or strike one of the large buttons located at the top of the pad.

MacTablet and Macintizer must be used with the accompanying pickup stylus. Since these tablets don't sense pressure on the drawing surface, they can't be used for finger painting, nor can they be used with pencil or pen. Fortunately, if you draw original art with either MacTablet or Macintizer, you can replace the plastic stylus with a ballpoint pen cartridge. As an alternative you can replace the entire stylus with a cross-hair cursor, also called a *puck*. Cross-hair cursors are ideal for exacting work, like floor plans or electrical schematics.

KAT and Macintizer connect to the Macintosh by way of the mouse port. Both are intended to replace the mouse, though you can get an adapter cable for Macintizer that lets you use the tablet and the mouse interchangeably.

MacTablet, on the other hand, attaches to the Mac through either the printer or modem port. Though this allows you to switch easily from the mouse to the digitizing pad, MacTablet requires a special driver program to operate. The program is installed on your work disks as a desk accessory that you select whenever you want to use MacTablet.

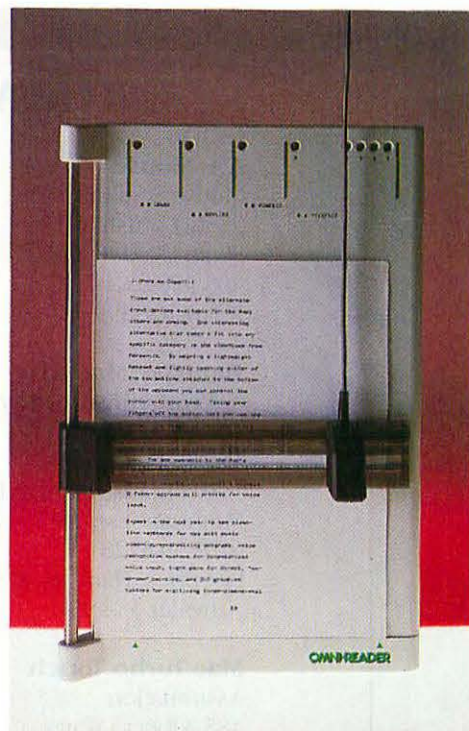
That approach has some limitations. One problem is that MacTablet isn't compatible with all Macintosh applications. Though it worked with nearly everything in my library, it didn't operate with *Filevision*.

Reading the Writing on the Wall

How long do you think it would take you to retype a 20-page typewritten manuscript on the Macintosh? If you were using Omni-Reader, an optical character reader from Oberon International, you could enter the entire manuscript in about 5 minutes. Omni-Reader recognizes typewritten characters, translates them into binary data, and sends the data to the Macintosh. It connects to one of the Mac's serial ports.

Omni-Reader recognizes four typewriter fonts: Courier-10, Courier-12, Letter Gothic-12, and Prestige Elite-12. It can also be programmed to recognize additional fonts by downloading typefaces from the Mac.

Using the device requires you to run a program called Omni to alert the Mac of Omni-Reader's input. Then you tack the ac-



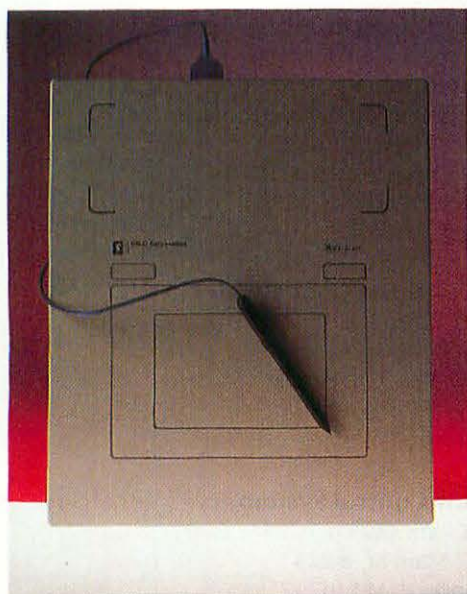
Omni-Reader

The Omni-Reader from Oberon International connects to one of the Mac's serial ports. You pass the Omni-Reader's head over a document to read typewritten text.

tual document onto the surface of Omni-Reader. Finally, you manually move the head of the reader back and forth over each line of type.

The device "reads" the characters it sees into almost any Macintosh application you happen to run, including *MacWrite* and *Microsoft Word*.

I found that using Omni-Reader took some practice. It was easy to move the reader head too slowly or too quickly across the paper. An annoyingly loud beep and a series of lights that flash across a control panel warn you when Omni-Reader isn't able to decipher the characters. I also found that it isn't 100 percent accurate. For example, on more than one occasion the letters *B* and *Q* were interpreted by Omni-Reader as the numerals 8 and 0.



Macintizer

The Macintizer from GTCO has a large active drawing area—9 by 14 inches—and allows you to reduce the input 33 percent.

The Alternative Mice

A+ Mouse

Mouse Systems Corp.
2336H Walsh Ave.
Santa Clara, CA 95051
408/988-0211
List price: \$99

Hamster, MacNifty Controller for Joystick and Trackball

The Kette Group
13895 Industrial Park Blvd.
Minneapolis, MN 55441
612/559-5728
List price: Hamster \$79.95, Con-
troller \$44.95

Mac Turbo Touch

Assimilation
485 Alberto Way
Los Gatos, CA 95030
408/356-6241
List price: \$129

MouseStick

Video 7
550 Sycamore
Milpitas, CA 95035
408/943-0101
List price: \$59.95

Macintizer

GTCO Corp.
1055 First St.
Rockville, MD 20850
301/279-9550
List price: \$599

MacTablet

Summagraphics Corp.
777 State St. Extension
Fairfield, CT 06430
203/384-1344
List price: \$495

KAT

Koala Technologies Corp.
3100 Patrick Henry Dr.
Santa Clara, CA 95052
800/562-2327
List price: \$229

Omni-Reader

Oberon International
Suite 630, LB 48
5525 McArthur Blvd.
Irving, TX 75038
214/257-0097
List price: \$799 with software

Scanstar-Mac

Computer Identities Corp.
5 Shawmut Rd.
Canton, MA 02021
800/622-2633
List price: \$600

Datapen

Datalogic Optic Electronics
20340 Center Ridge
Rocky River, OH 44116
216/333-9410
List price: \$375

PC-380 Bar Code Reader

TPS Electronics
4047 Transport St.
Palo Alto, CA 94303
415/856-6833
List price: \$795

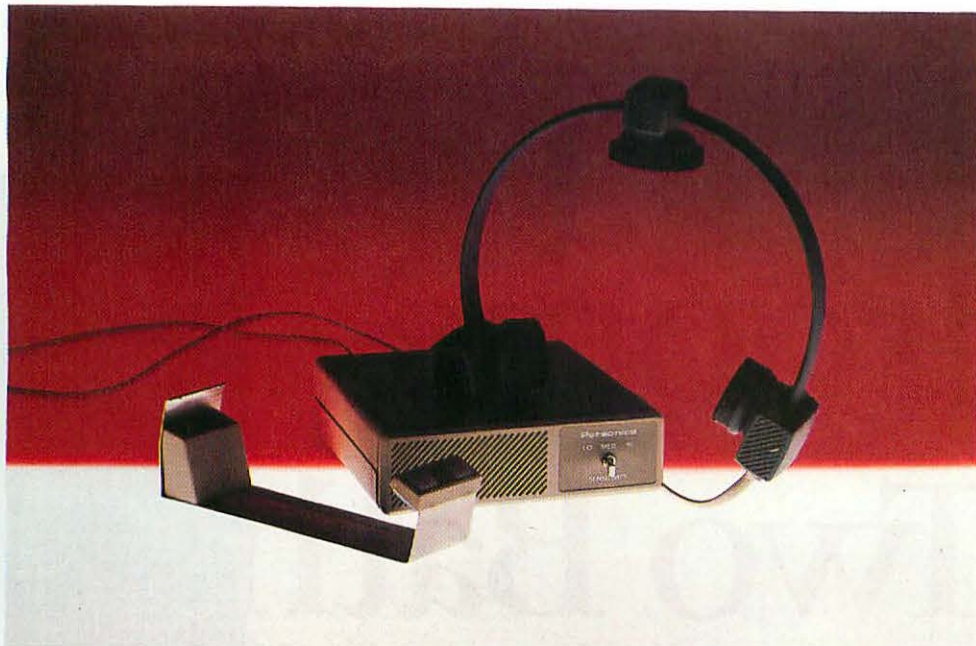
View Control System

Personics Corp.
747 Main St. #224
Concord, MA 01742
617/371-1904
List price: \$200



Scanstar-Mac

The Scanstar-Mac from Computer Identities allows you to read bar-code labels by passing a wand over a preprinted label. Scanstar-Mac attaches to the Mac in place of the keyboard.



View Control System

The Personics View Control System (VCS) lets you control the screen pointer with your head. The VCS contains a lightweight headset, a control unit, and a two-button assembly that mounts on the keyboard.

Switching letters isn't too bad, since you can usually catch mistakes by proof-reading the document. But if you enter a lot of numbers, even one mistake can mean big trouble. When you're entering just numbers, you can use Omni-Reader in the numbers-only mode. Reliability is increased more than twofold, since the device has to distinguish among only 10 characters.

Bar-code readers similar to the kind used by your neighborhood supermarket are also available for the Mac. They are primarily for inventory control, retail sales, and other applications in which you must keep track of individual items. Bar-code readers for the Mac are available from Datalogic Optic Electronics, TPS Electronics, and Computer Identics, which also sells a program that generates bar-code labels.

Most bar-code readers are surprisingly simple. At the heart of the reader is the wand, which includes both a light emitter and a light detector. The wand is used to read the thick and thin lines common to all bar-code labels. The lines are translated into numbers and letters by the reader's electronics. Bar-code readers are connected between the Mac and the keyboard, so that data from the reader is treated as data from the keyboard.

More to Come?

Those are but a few of the input devices available for the Mac; others are coming. One interesting alternative that doesn't fit into any specific category is the View Control System (VCS) Mouse from Personics. By wearing a lightweight headset and

Most bar-code readers are surprisingly simple.

lightly touching either of two buttons attached to the bottom of the keyboard, you can control the cursor with your head. Releasing the buttons lets you use the mouse. The VCS consists of the headset, the keyboard buttons, and a small box that sits on top of the Mac. The box is connected to the mouse port and contains an infrared sensor that receives the headset's signals. Personics plans an upgrade to allow for voice input.

Expect in the next year to see piano-like keyboards for use with music composing and synthesizing programs, voice recognition systems, light pens for on-screen painting, and three-dimensional graphics tablets for digitizing three-dimensional objects.

With all these input devices attached to your Mac, a third hand isn't such a bad idea after all. □

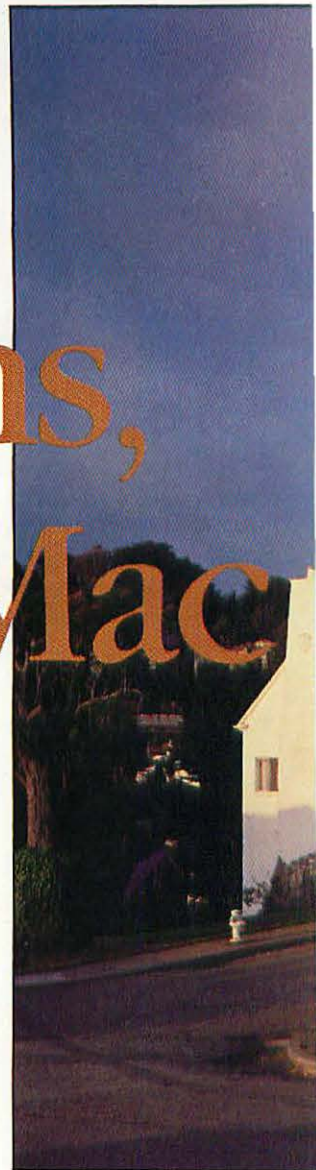
▲▲▲▲▲▲▲▲▲▲ Gordon McComb is a Contributing Editor of Macworld.

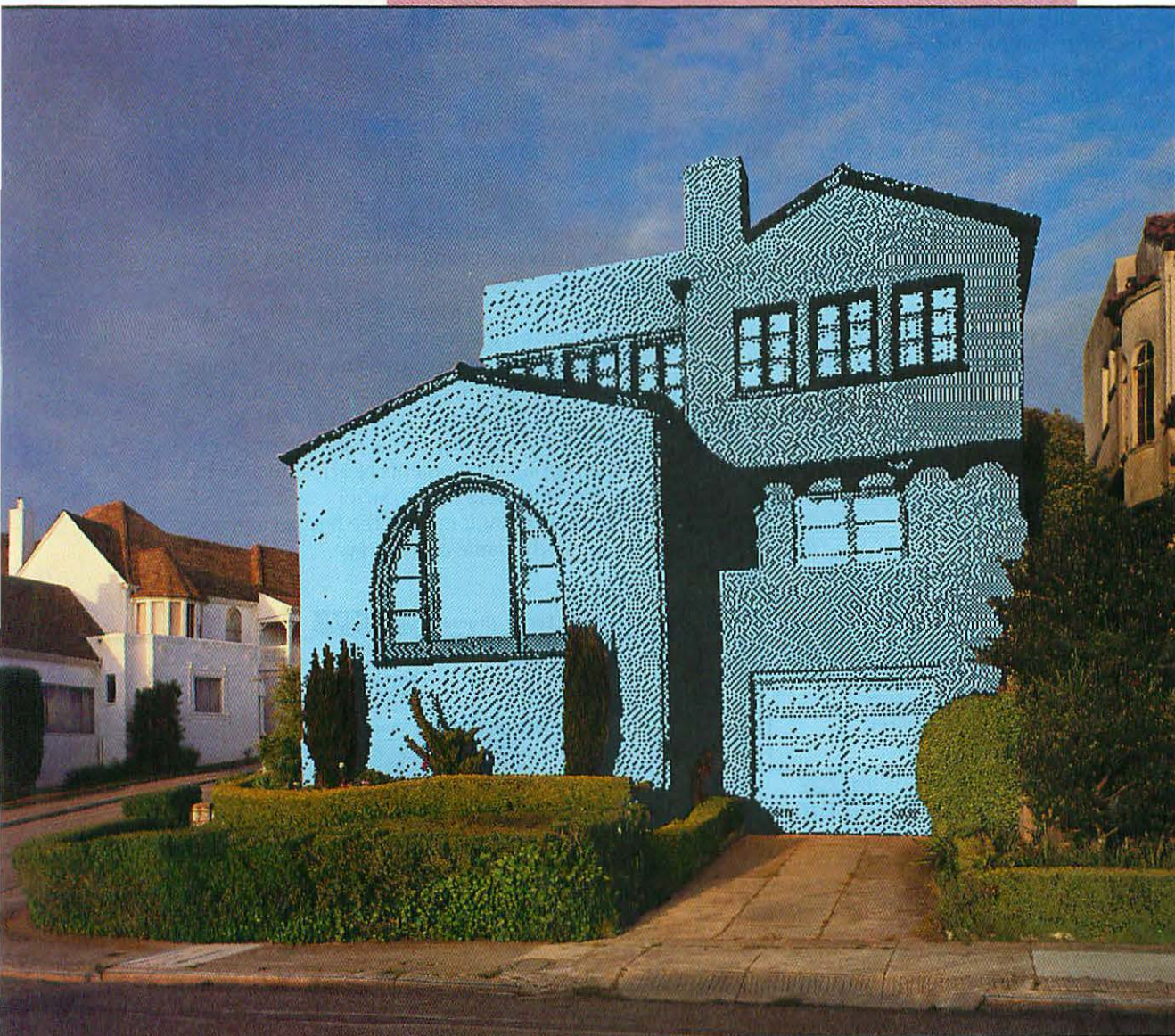
Three Bedrooms, Two Baths, One Mac

Jim Heid

You have come into an inheritance, which finally allows you to move from your modest two-bedroom apartment in the city to a house in the suburbs. You already know exactly what you want—a split-level home in the Sunset or Pine Ridge area for about \$125,000, with three bedrooms, a large yard so you can get a dog for your daughter, hardwood floors, and a garage. You meet with your friend Erica, who is a real estate agent, and tell her what you are looking for. On her Macintosh she types the information into a database that includes all the available houses in the metropolitan area. A few minutes later a report containing the houses meeting your criteria is printed out on the LaserWriter.

The scene may seem ordinary for a real estate office, but one difference stands out: the electronically produced report includes a photo of each house.





▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲
Let your mouse do the house hunting with real estate listings in Microsoft File, whose picture field opens the door to specialized database applications that include visual information.

Microsoft File's ability to store graphic images as fields in a record lets you add a visual dimension to databases (see "File, Macintosh Style," *Macworld*, May 1985). You can include *MacPaint* pictures, *MacDraw* images, and graphs created with *Microsoft Chart* in a *File* database.

Combine *File* with an image digitizer, and the possibilities increase. You can, for example, design a real estate database like the one just described, with digitized images of the houses for sale. A real estate agent can produce a report showing not only the vital statistics of each property but also the property itself. Agents and prospective buyers can use *File*'s Find command to search for houses meeting their requirements and then print those records.

To illustrate how to set up a visual database with *File*, I've created a sample real estate database. Because of the memory and storage requirements imposed by digitized graphics, you need a 512K Mac with an external disk drive for serious data management jobs. A hard disk is better still, because of its speed and storage advantages.

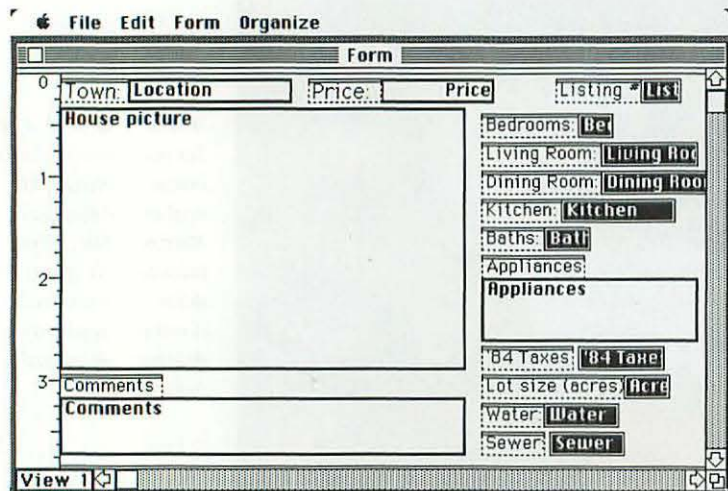


Figure 1

Remember *File*'s formatting shortcuts when designing the database. Here, all the selected number fields will be formatted simultaneously. When you format the picture field, select the Clip option rather than Scale to avoid distorting the image.

Designing the Form

First start *File* and design the form for the real estate data (see Figure 1). You can format several fields at once, such as all the number fields. Select the fields by either Shift-clicking on each one or enclosing them in a marquee; then choose Format Field from the Form menu. Keep the design simple. Avoid mixing fonts and styles; the form looks more professional, and *File* performs better when the program doesn't have to load several fonts into memory.

When you format the field that holds the pictures of the houses, you have the choice of two options that affect the image. The Clip option causes *File* to crop any part of the image that doesn't fit in the picture field box, and the Scale option stretches or shrinks the image to fit in the box, causing some distortion. To avoid cropping or distorting the image and having to redesign the form, I sized the picture field to match the size of the digitized photographs.

The next step is to enter the data for each house. Type the appropriate information in each field, pressing Return or Tab to advance to the next field. Remember *File*'s keyboard shortcuts; ⌘-apostrophe ('), for example, copies the contents of a field in a previous record to the same field in the current record. This shortcut is convenient if most of the houses in the database are in the same city or town.

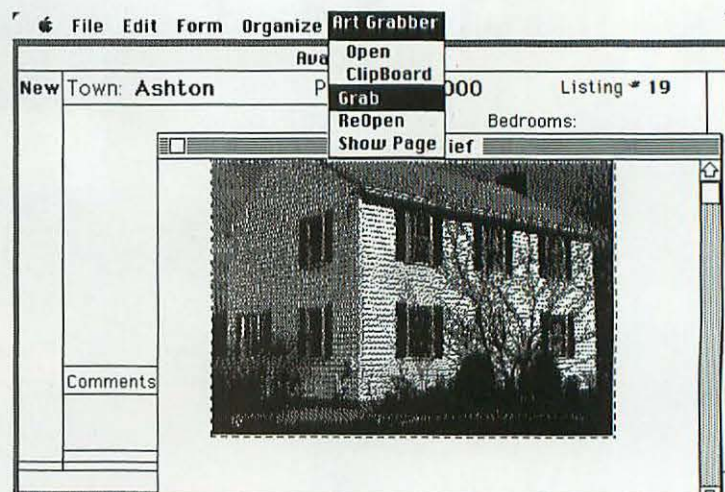


Figure 2

To transfer digitized images into *File*, choose Art Grabber from the Apple menu. When Art Grabber appears on *File*'s menu bar, choose Open from the Art Grabber menu. Locate the desired picture's name in the dialog box and click Open. Select the image by enclosing it in the marquee, and copy the image to the Clipboard by choosing the Grab command. Finally, close the Art Grabber window, select the picture field, and paste in the image.

Get the Picture

Several digitizing systems are available for creating the images to be stored in *File* (see "Pictures to Pixels," *Macworld*, April 1985). For this application I used Thunderware's ThunderScan, which is installed in the Imagewriter's ribbon carriage and scans any document that can be rolled through the printer. I digitized 3½- by 5-inch photos so that the images wouldn't have to be cropped or scaled extensively to fit in the picture field box.

You need to transfer the digitized image into *File*. The ThunderScan software allows you to save the image as a MacPaint document. You can use Hayden Software's Art Grabber desk accessory from within *File* to retrieve the image and paste it into the database

(see Figure 2). If you don't have Art Grabber, you can store the images in the Scrapbook and paste them into *File*. First select the image; most digitizer software provides a marquee. Then copy it to the Clipboard and paste it into the Scrapbook. The Scrapbook containing the pictures must be on the same disk as *File*, unless you have the program on a disk without a System Folder. If the box you created for the picture field is too large or too small, choose *File*'s Show Form command and drag the lower edge of the picture field box to adjust its size.

Using the Database

Once you've entered the data, you can use *File*'s retrieval and reporting features. You might want to switch to a List Helper view for proofreading or fast browsing. List Helper displays records in rows and columns (see Figure 3). To switch between the List Helper and your custom form, double-click on any record number or type ⌘-T. You may want to modify the form so that more data is visible at once on screen. If you just need to view the vital statistics for the house listings, you can hide the picture and comment fields. Return to the Form window and drag the picture field and the Comments text field into the hide area—the large dotted area below the form. The contents of those fields remain in *File* but are not visible in the form window.

	Location	Price	'84 Taxes	Lot size	Bed.	Baths	Water
1	Dublin	\$153,222	\$2,200	4	6	3	well
2	Newport	\$76,000	\$1,450	1.5	2	1.5	town
3	Ashton	\$84,500	\$1,795	2	3	2	well
4	Wilton	\$65,000	\$950	1	3	1	town
5	Wilton	\$85,000	\$1,750	2	4	2	town
6	Harrisville	\$156,000	\$870	1	4	1.5	town
7	Harrisville	\$135,000	\$650	0.5	2	1	town
8	Greenfield	\$76,000	\$1,500	2	4	2	town
9	Dublin	\$143,000	\$750	0.5	3	1	town
10	Newport	\$76,000	\$1,650	1.5	3	2	well
11	Ashton	\$94,000	\$1,800	3	4	2.5	town
12	Wilton	\$74,000	\$1,260	2	3	2	well
13	Harrisville	\$112,000	\$1,880	5	5	3	well
14	Greenfield	\$98,000	\$1,800	4	4	2	town
15	Greenfield	\$85,000	\$1,470	3	3	2	town
16	Marlboro	\$65,000	\$1,840	1.3	3	2	town
17	Ashton	\$80,000	\$1,700	1	3	1.5	town

Figure 3

File's List Helper displays data in rows and columns, which allow you to see many records on the screen at once for quick reference or proofreading. You can switch views by double-clicking on any record number.

Find

Find Clear

Town: Ashton Price: <100000 Listing #

Bedrooms: >=2
Living Room:
Dining Room:
Kitchen:
Baths: >=1.5
Appliances
range *refrigerator*
'84 Taxes
Lot size (acres) >=1
Water:

Comments

Figure 4

The Find window lets you locate specific records, such as all houses in Ashton on one or more acres of land, costing under \$100,000, and with two or more bedrooms, one and a half or more baths, and a range and a refrigerator.

File Edit Form Organize

Available Houses

Town: Ashton Price: \$89,000 Listing # 25

Bedrooms: 3
Living Room: 11 x 22
Dining Room: 10 x 12
Kitchen: 14 x 14
Baths: 1.5
Appliances
electric range,
dishwasher, refrigerator
'84 Taxes \$1,700
Lot size (acres) 1
Water: town
Sewer: septic

Comments
Enjoy country seclusion with this colonial. Sunny lot with hardwoods, willows, and berry bushes. Recently painted inside and out, this gem is in move-in condition. Heats with wood.

Figure 5

The Find criteria in Figure 4 match this record. Notice that the words range and refrigerator in the Appliances field do not have to be in the order they appear in the Find window, where asterisks were used as wild-card characters.

To look for specific records, choose Find on the Organize menu. Suppose you have a client looking for a house in the town of Ashton that costs less than \$100,000, has two or more bedrooms, and is on at least one acre of land. Set up the Find window as shown in Figure 4 and click Find. *File* searches the database and displays the records that meet those criteria (see Figure 5).

You can print the records by choosing Print Records on the *File* menu. To specify whether headers, footers, grid lines, or record numbers should be printed, choose the Page Setup option. Choose the Report command on the Organize menu to print a columnar report. Drag the fields on which you want the report to be sorted into the Sort area. Drag the fields that you don't want to appear in the report into the Not Shown area. You may want to specify statistical functions for certain fields to spot trends or summarize the data. For example, you can calculate the cost of an

average house in each town (see Figure 6). If you want to include pictures in a report, you have to increase the height of all the fields by dragging the line between fields so that the entire picture is shown.

To see what a printed report will look like, click the Preview button (see Figure 7). You can return to the report window and adjust the design if needed. When you're satisfied with the report's design, you can save it by choosing Save Report on the File menu.

More than Real Estate

The real estate database is one example of databases you can create with *File* and an image digitizer. Here are a few other examples.

- An inventory database containing pictures of widgets and gizmos.
- A personnel database containing photos of employees.
- A personal inventory database containing digitized images of your major belongings along with their serial numbers and other important information. Make sure the disks are safely stored; they won't do you much good if they're stolen along with your belongings.
- A videotape catalog that includes a representative scene from each movie in your collection.
- A baseball card or stamp collection database, with digitized images of each item.

Although the digitized images you include in your *File* database lack the color and clarity of the original photo or real-world object, you'll have a visual reference that is worth at least a few hundred words. □

Sort	A->Z	1->9	Not Sorted			
Heading	Location	Price	Lot Size (acres)	Bed-rooms	Baths	1984 Taxes
Field	Location	Price	Acreage	edroom	Baths	'84 Tax
by Price						
by Location			Average	Average	Average	Average
Grand		Average				

Figure 6

This report design prints a columnar report sorted by location and price. The word Average in the "By Location" row tells *File* to print the average cost, lot size, number of bedrooms and baths, and 1984 tax figures for each town in the database.

Location	Price	Lot Size (acres)	Bed-rooms	Baths	1984 Taxes
Ashton	\$84,500	2	3	2	\$1,795
	\$89,000	1	3	1.5	\$1,700
	\$94,000	3	4	2.5	\$1,800
Average for Ashton:		2	3.3333	2	\$1,765
Dublin	\$143,000	0.5	3	1	\$750
	\$153,222	4	6	3	\$2,200
Average for Dublin:		2.25	4.5	2	\$1,475
Greenfield	\$76,000	2	4	2	\$1,500
	\$85,000	3	3	2	\$1,470
	\$98,000	4	4	2	\$1,800

Records processed: 8 Records to process: 17 [Resume] [Cancel]

Figure 7

An on-screen preview of the report defined in Figure 6. You can print a report's text or save it on disk for later embellishment with a word processor.

Jim Heid is a Contributing Editor of Macworld.

Microsoft File
Microsoft Corp.
 10700 Northup Way
 Bellevue, WA 98009
 800/427-9400, 206/828-8080 in
 Washington and Canada
 List price: \$175

ThunderScan
Thunderware
 21 Orinda Way
 Orinda, CA 94563
 415/254-6581
 List price: \$229

Art Grabber
Hayden Software Co.
 600 Suffolk St.
 Lowell, MA 01854
 800/343-1218
 List price: \$49.95

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Circle 321 on reader service card

Now there's a Mouse that flies.

*Introducing the View Control System.™
Ultrasonic technology that moves your
cursor at the speed of sight.*



Your relationship with your Mac is about to change. Dramatically. Because now the View Control System (or VCS) from Personics™ gives you a powerful new way to control the cursor. Fast. Direct. Intuitive. It's the best thing since the Mouse. In fact, it's better.

View Control

The VCS uses a remarkable new technology for moving the cursor where you look on the screen. A lightweight headset translates subtle, natural head rotation into cursor movement commands. Look to the right and the cursor moves right. Look down and to the left and the cursor moves accordingly. Zip from corner to corner, or point to a tiny target with ease, even an individual pixel!

Look Ma, Both Hands!

Now you don't have to take your hand off the keyboard to reach for the Mouse. The VCS features a unique

button pad which clips on your keyboard just below the space bar. One button activates the headset. Use the second button for clicking and dragging. The VCS gives you instant cursor control without forcing your hands off the home keys. No more reach, grab, roll, click, return.



Faster than a Speeding Mouse

The VCS is accurate. Just like a mouse. But since you can look much faster than you can reach and roll, it gives you far greater speed. And because your hands stay on the keyboard you maintain continuity and concentration. For keystroke-intensive applications like word processing and spreadsheet, expect a real boost in productivity.

Reclaim Your Desktop

The VCS flies above the ordinary mouse, leaving more space on your desktop. Now you have room for books, papers and your favorite coffee cup. Of course, if you want your mouse within reach, there's no problem. You can connect your mouse and VCS to the Mac at the same time and use them interchangeably.

State-of-the-art-Technology

Personics has developed a proprietary ultrasonic technology for the VCS.* The headset receives an ultrasonic signal transmitted from the VCS Control Unit which sits on top of the Mac. Changes in the rotation and angle of the head are tracked and electronically translated into quadrature signals just like those produced by the Mouse. And the VCS works with any 128K or 512K Mac and off-the-shelf software. Plug it in and you're ready to go. No hardware or software modifications are required.

*Patent Pending.

IBM PC and Apple II versions available soon.



Get Acquainted in 15 Minutes

The VCS is easy to use. Learning is fun and, before long, view control becomes almost second nature. You'll simply look and click. The VCS headset is comfortable, lightweight and adjustable. It accommodates eyeglasses and won't muss up your hair. And since the VCS headset doesn't rest on your ears, you're free to talk on the phone.

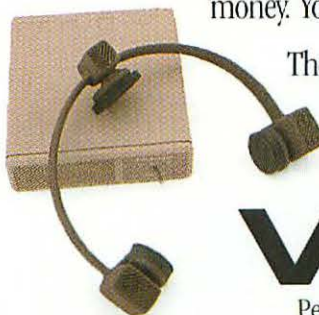
Just \$199.00 and Easy To Order

The VCS is available right now, directly from Personics. Call us toll free. A member of our sales staff will be happy to answer your questions and provide additional information. If you're ready to order, please have your major credit card at hand when you call. All orders are processed immediately and shipped within 24 hours. And we back the VCS with a full one year limited warranty.

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In Massachusetts 800-447-1196
Or Call Collect 617-369-9616

Satisfaction Guaranteed

When your VCS arrives, try it for 30 days. If you are not completely satisfied, return it and we will swiftly refund your money. Your satisfaction is the only judge.



The VCS. A simple and direct link between man and computer. Try it, and watch your ideas take off.

VCS™

Personics Corporation
2352 Main Street, Concord, MA 01742

Circle 85 on reader service card

Snowflakes and Dragons

*Drawing fractals
with Macintosh Pascal*

Matthew Zeidenberg

Looking at a snowflake from 6 feet away, you could describe it as a dot. Get a little closer, and the dot takes on detail. Zoom in to within a couple of inches, and its shape becomes difficult to describe. In the natural world you see shapes that have infinite detail, such as the edge of a leaf or the surface of a crystal. Describing detail at the level that occurs in nature is a problem that is addressed in the study of fractals.

If you use Macintosh Pascal, you have probably seen the program Sierpinski, which is on the Pascal disk. This program generates a beautifully complex pattern that is an example of a mathematical object called a fractal. The visual and conceptual appeal of fractals was made popular by mathematician Benoit B. Mandelbrot, whose book *The Fractal Geometry of Nature* (Freeman, 1983) is a collection of exotic mathematical objects and a detailed study of their nature and application in a variety of fields, including biology, physics, and economics.

Mandelbrot asks the question, How long is a coastline? The answer depends on how closely you look. If you measure a coastline on a map of the world, you get one answer, and if you measure each little inlet on a detailed coastal map, you get another. If you measure each grain of sand and every pebble on the beach, you get still another answer. Effectively, the length of a coastline is infinite; a coastline is an example of a fractal, an object of fractional dimension. It is the ultimate zigzag, in which the zigs and the zags are infinitely short.

Besides coastlines, the surfaces of many natural objects, such as forests and mountains, can be simulated with fractals. *Star Trek* fans may remember the planet Genesis in the film *Star Trek II: The Wrath of Khan*. It was created with fractals and computer animation.

Fractals in a plane have a dimension between a line (dimension one) and a surface (dimension two). Fractals in space have a dimension between a surface and a solid (dimension three).

One property common to many fractals is that a part resembles the whole. Each branch of a tree, for example, somewhat resembles the whole tree. Each secondary branch resembles the tree and the primary branch. If the branching in a tree continued ad infinitum, the tree would be a fractal.

Generating Fractals

Fractals can be constructed by repeatedly applying a set of rules to a given shape. Each fractal grows in generations from a seed called an *initiator*. The initiator can have the value $n = 0$ or $n = 1$, depending on where you choose to start counting generations. Each generation (n) is the product of the previous generation ($n - 1$). The rule or set of rules that you use to transform a given fractal from its initiator to each succeeding generation is called the *generator*. While the initiator and the generator completely describe how to construct a given fractal, its final shape is defined when the number of generations approaches infinity.

Since it's impossible to run a program for an infinite length of time, you can't create an actual fractal on a computer—or any other way, for that matter—but you can produce a good approximation.

Using Recursion

Since fractals are recursive objects, you can draw them on a computer using a recursive procedure or function. A recursive function is one that calls itself. The classic example of a recursive function computes the factorial of an integer n . The factorial of n is the product of the integers from 1 to n , expressed mathematically as $F(n) = n * F(n - 1)$.

For a good introduction to the mysteries of recursion, see Douglas Hofstadter's *Godel, Escher, Bach: The Eternal Golden Braid* (Basic Books, 1979).

Fractal Programs

The Macintosh is probably the first personal computer with adequate graphics for producing fractals. The fractals shown on the following pages are included in Mandelbrot's book and were created by programs in Macintosh Pascal using recursive Pascal procedures (see Listings 2, 3, and 4). If you type the programs in and run them, you can watch the fractals grow.

The fractal programs share the procedure *Init*, which asks you for the generation (n) of the fractal and creates the drawing window. If you plan to type more than one of these programs into the Mac, save *Init* in a separate file, which you can paste into each program through the Clipboard.

The statement `SaveDrawing('Filename')` right before the end of each program saves the contents of the drawing window in a file that can be read by *MacPaint*. You can also press ⌘-Shift-3 to take a snapshot of the screen.

Another interesting modification you can make is to allow the initiator and the generator to be entered with the mouse and to generate a fractal based on the input.

The next six pages contain three examples of the infinite variety of fractals and the Pascal programs that produced them. You can generate many of the others in Mandelbrot's book, or you can invent your own. Many beautiful fractals have yet to see the light of the Macintosh screen.

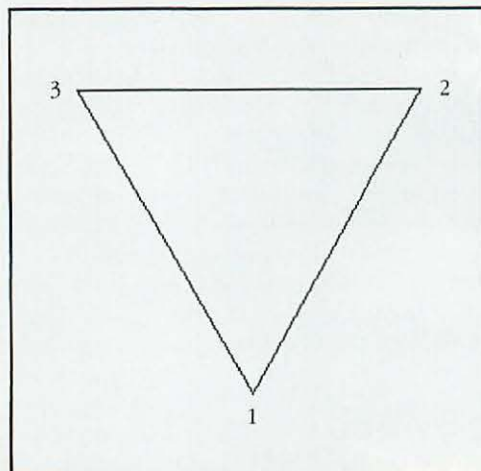
Matthew Zeidenberg is a graduate student in computer science at the University of Wisconsin, Madison.



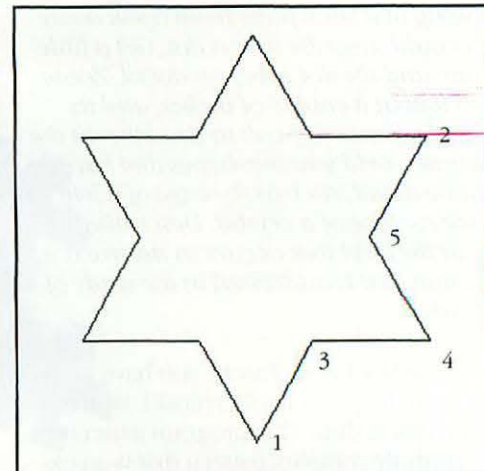
Koch

Generated by the Koch program (see Listing 2), this fractal begins with an equilateral triangle. The generator replaces the middle third of each side with two sides of an equilateral triangle erected from the endpoints of the removed segment, forming a Star of David. The procedure is repeated for each generation.

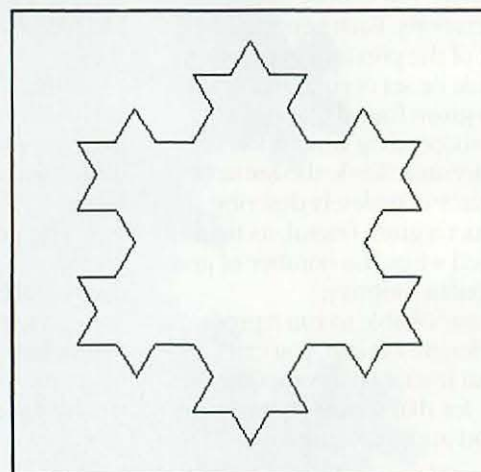
Since the initiator consists of three line segments, the main program calls the procedure `kochr` three times, once for each segment. The intermediate points necessary to create the second generation define four new segments that become initiators in recursive calls to `kochr`.



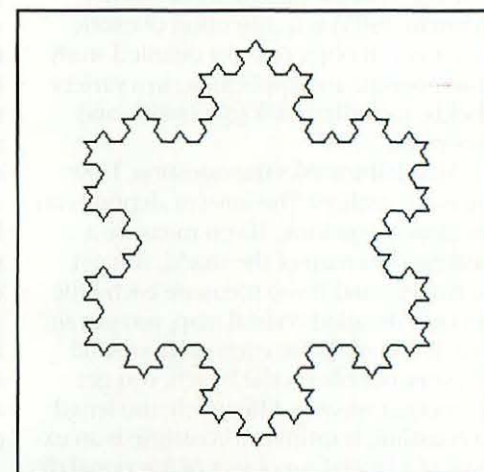
n=1



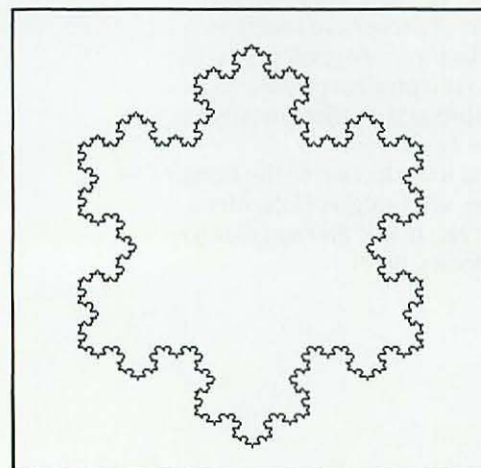
n=2



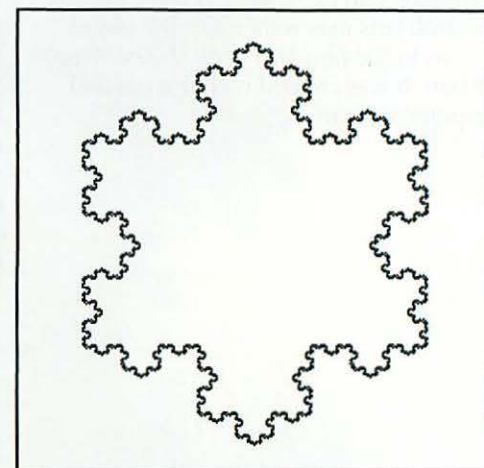
n=3



n=4



n=5



n=6


```

program koch;
  const
    sin60 = 0.8660254;
    scaling = 100.0;
  {xorig, yorig is center point of koch}
    xorig = 250;
    yorig = 150;
  var
    x1, y1, x2, y2, n, x3, y3 : integer;

  {Procedure to create nth generation curve}
  {given two points that define the initiator}
  procedure kochr (x1, y1, x2, y2, n : integer);
    var
      xdiff, ydiff, x3, y3, x4, y4, x5, y5 : integer;
    begin
      {if n=1, draw the curve}
      if (n = 1) then
        drawline(x1 + xorig, y1 + yorig, x2 + xorig, y2 + yorig)
      else
        {otherwise create the next generation}
        begin
          {calculate the points of the next generation}
          xdiff := x2 - x1;
          ydiff := y2 - y1;
          x3 := x1 + round(xdiff / 3);
          y3 := y1 + round(ydiff / 3);
          x4 := x1 + round(xdiff / 2 - ydiff * sin60 / 3);
          y4 := y1 + round(ydiff / 2 + xdiff * sin60 / 3);
          x5 := x1 + round(xdiff * 2 / 3);
          y5 := y1 + round(ydiff * 2 / 3);
          {recursive calls to kochr for each new segment}
          kochr(x1, y1, x3, y3, n - 1);
          kochr(x3, y3, x4, y4, n - 1);
          kochr(x4, y4, x5, y5, n - 1);
          kochr(x5, y5, x2, y2, n - 1)
        end;
      end;
    end;

  {Draw text window, prompt for n}
  {Display drawing window}
  procedure init (var n : integer);
    var
      drawwin : rect;
    begin
      hideall;
      showtext;
      write(' Input order of curve:');
      readln(n);
      hideall;
      drawwin.top := 40;
      drawwin.left := 0;
      drawwin.right := 512;
      drawwin.bottom := 512;
      setdrawingrect(drawwin);
      showdrawing;
    end;

  {main program to draw Koch curve}
  begin
    init(n);
    {define initiator}
    x1 := 0;
    y1 := round(scaling * sin60);
    x2 := round(scaling);
    y2 := -round(scaling * sin60);
    x3 := -round(scaling);
    y3 := -round(scaling * sin60);
    {call kochr for each segment}
    kochr(x1, y1, x2, y2, n);
    kochr(x2, y2, x3, y3, n);
    kochr(x3, y3, x1, y1, n);
  end.

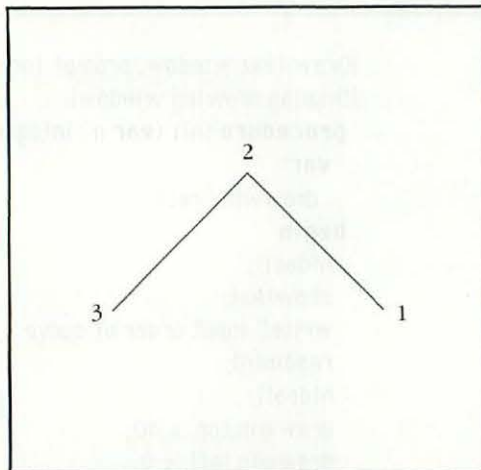
```

Listing 2

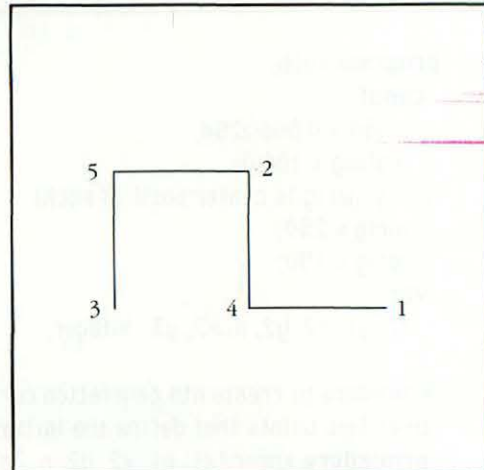
Dragon

The Dragon program produces this fractal (see Listing 3). Each generation replaces each line segment in the previous generation with two line segments at a right angle to each other. Like the snowflake fractal, this fractal is an example of how complex and apparently inexplicable patterns in nature can be generated with relatively simple rules.

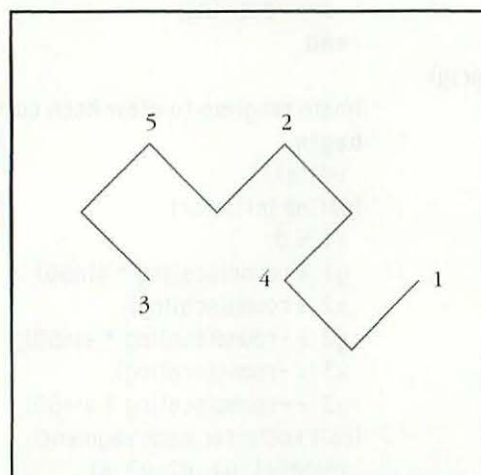
The procedure dragonr takes the initiator, which is defined by three points, and calculates two intermediate points. The resulting five points define two new initiators, which are used in recursive calls to dragonr.



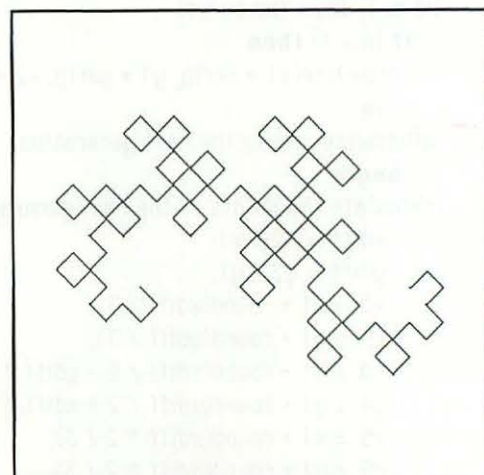
n=1



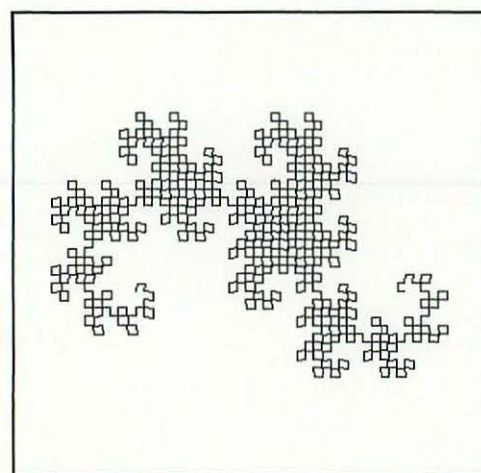
n=2



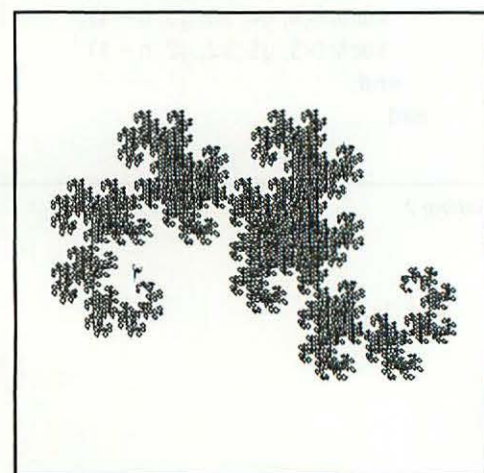
n=3



n=7



n=10



n=13


```

program dragon;
const
{Center point of dragon}
  xorig = 250;
  yorig = 180;
  scaling = 100;
var
  x1, y1, x2, y2, x3, y3, n : integer;

{Procedure to create nth generation}
{Given three points for the initiator}
procedure dragonr (x1, y1, x2, y2, x3, y3, n : integer);
var
  x4, y4, x5, y5, ydiff, xdiff : integer;
begin
{If n=1, draw the curve}
  if (n = 1) then
    begin
      drawline(x1, y1, x2, y2);
      drawline(x2, y2, x3, y3);
    end
  otherwise construct next generation}
    else
      begin
{Calculate next generation points}
        x4 := ((x1 + x3) div 2);
        y4 := ((y1 + y3) div 2);
        x5 := x3 + (x2 - x4);
        y5 := y3 + (y2 - y4);
{Recursive calls to dragonr}
{create succeeding generations }
        dragonr(x2, y2, x4, y4, x1, y1, n - 1);
        dragonr(x2, y2, x5, y5, x3, y3, n - 1);
      end;
    end;
end;

{Draw text window, prompt for n}
{Display drawing window}
procedure init (var n : integer);
var
  drawwin : rect;
begin
  hideall;
  showtext;
  write(' Input order of curve:');
  readln(n);
  hideall;
  drawwin.top := 40;
  drawwin.left := 0;
  drawwin.right := 512;
  drawwin.bottom := 512;
  setdrawingrect(drawwin);
  showdrawing;
end;

{Main program to draw dragon}
begin
  init(n);
{Define the initiator}
  x1 := xorig + scaling;
  y1 := yorig;
  x2 := xorig;
  y2 := yorig - scaling;
  x3 := xorig - scaling;
  y3 := yorig;
{Call dragonr to create nth generation}
  dragonr(x1, y1, x2, y2, x3, y3, n);
end.

```

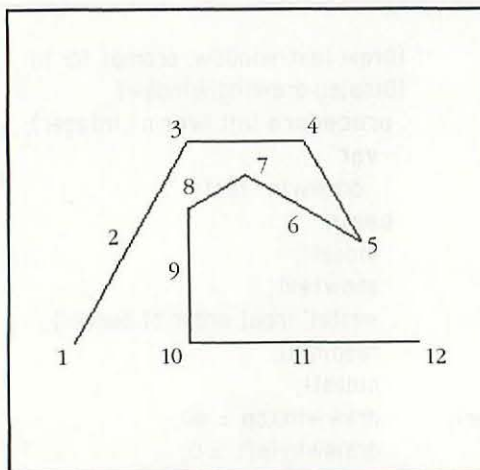
Listing 3



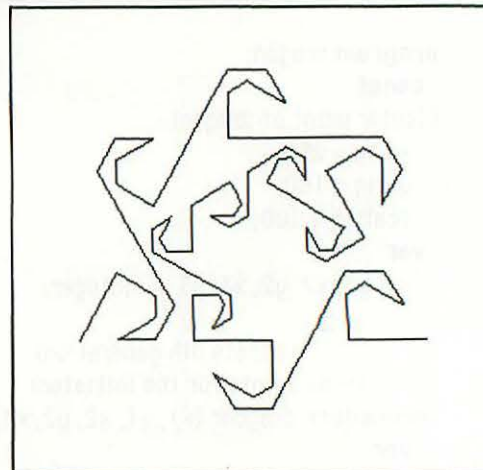
Snowflake

Produced by the Snowflake program (see Listing 4), this fractal gives you some insight into how snowflakes grow in nature, although it doesn't have true sixfold symmetry. The initiator is a line segment. The generator replaces each line segment with seven line segments defined by 12 numbered points, as shown in the first generation ($n=1$).

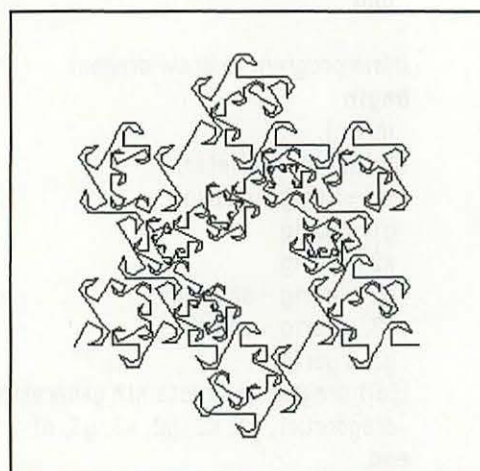
The procedure snow takes the initiator and defines 12 intermediate points that define 11 segments. Each line segment is used as input in a recursive call to snow.



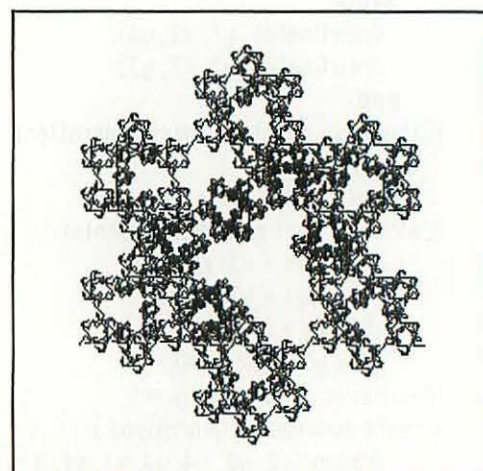
$n=1$



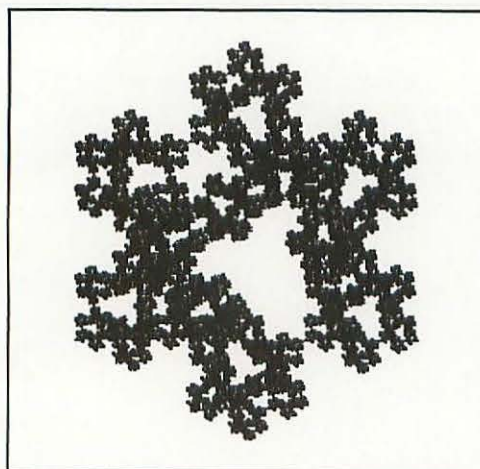
$n=2$



$n=3$



$n=4$



$n=5$


```

program snowflake;
const
  {Center point of snowflake}
  xorig = 250;
  yorig = 230;
  scaling = 100;
  s = 0.5773;
var
  x1, y1, x2, y2, n : integer;

  {Procedure to create nth generation curve}
  {Given two points that define the initiator}
  procedure snowr (x1, y1, x12, y12, n : integer);
    var
      ydiff, xdiff, i : integer;
    {arrays store 12 points of next generation}
    x : array[2..12] of integer;
    y : array[2..12] of integer;
    begin
      {Calculate the points of the next generation}
      x[12] := x12;
      y[12] := y12;
      xdiff := x12 - x1;
      ydiff := y12 - y1;
      x[10] := x1 + xdiff div 3;
      y[10] := y1 + ydiff div 3;
      x[11] := x1 + (xdiff * 2) div 3;
      y[11] := y1 + (ydiff * 2) div 3;
      x[3] := x[10] + round(ydiff * s);
      y[3] := y[10] - round(xdiff * s);
      x[9] := x[10] + round(ydiff * s / 3.0);
      y[9] := y[10] - round(xdiff * s / 3.0);
      x[8] := x[10] + round(ydiff * s * 2.0 / 3.0);
      y[8] := y[10] - round(xdiff * s * 2.0 / 3.0);
      x[2] := (x1 + x[3]) div 2;
      y[2] := (y1 + y[3]) div 2;
      x[4] := x[11] + round(ydiff * s);
      y[4] := y[11] - round(xdiff * s);
      x[6] := x[11] + round(ydiff * s * 2.0 / 3.0);
      y[6] := y[11] - round(xdiff * s * 2.0 / 3.0);
      x[5] := (x12 + x[4]) div 2;
      y[5] := (y12 + y[4]) div 2;
      x[7] := (x[8] + x[4]) div 2;
      y[7] := (y[8] + y[4]) div 2;

      {if n=1, draw the curve}
      if (n = 1) then
        begin
          moveto(x1, y1);
          for i := 2 to 11 do
            begin
              lineto(x[i], y[i]);
            end;
          lineto(x12, y12);
        end

        {otherwise calculate the next generation}
      else
        begin
          {recursive calls to snowr for each of the 11 segments}
          snowr(x[2], y[2], x1, y1, n - 1);
          snowr(x[2], y[2], x[3], y[3], n - 1);
          snowr(x[3], y[3], x[4], y[4], n - 1);
          snowr(x[4], y[4], x[5], y[5], n - 1);
          snowr(x[5], y[5], x[6], y[6], n - 1);
          snowr(x[7], y[7], x[6], y[6], n - 1);
          snowr(x[7], y[7], x[8], y[8], n - 1);
          snowr(x[9], y[9], x[8], y[8], n - 1);
          snowr(x[9], y[9], x[10], y[10], n - 1);
          snowr(x[11], y[11], x[10], y[10], n - 1);
          snowr(x[11], y[11], x[12], y[12], n - 1);
        end;
      end;

      {Draw text window, prompt for n}
      {Display the drawing window}
      procedure init (var n : integer);
        var
          drawwin : rect;
        begin
          hideall;
          showtext;
          write(' Input order of curve:');
          readln(n);
          hideall;
          drawwin.top := 40;
          drawwin.left := 0;
          drawwin.right := 512;
          drawwin.bottom := 512;
          setdrawingrect(drawwin);
          showdrawing;
        end;

      {main program to draw snowflake}
      begin
        init(n);
        {define the initiator}
        x1 := xorig - scaling;
        y1 := yorig;
        x2 := xorig + scaling;
        y2 := yorig;
        {call snowr to create nth generation curve}
        snowr(x1, y1, x2, y2, n);
      end.

```




Announcing the only devoted entirely to

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the Macintosh Magazine,
August 21-23, 1985, Bayside
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Day one is for dealers, distributors, retailers, and other third-party vendors to talk to Apple and the 100+ exhibiting companies about their products.

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Professionals: Doctors, nurses, bankers, lawyers, engineers, stockbrokers, real estate and insurance agents, CPAs, consultants

Education: Administrators, faculty, students

Here's a look at some of the conference sessions designed for you:

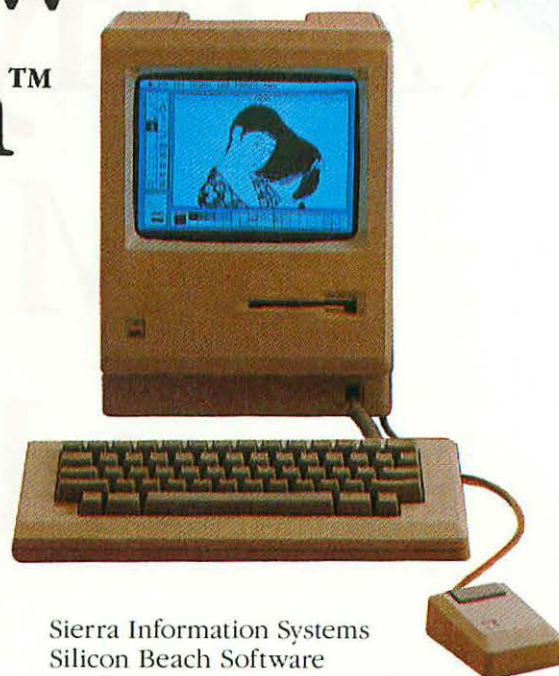
- The Outlook for the Mac in the Office
- Developing Software for the Macintosh
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- Maximizing MacPaint®
- The Mac Clinic
- A Guide to Better Business Graphics
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Apple Computer, Inc.
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Apropos Software, Inc.
Artline Industries
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Blue Chip Software
Boston Software
Brain Power, Inc.
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Computer Identities
Computer Learning Systems
Computer Shopper
Computer Software Designs, Inc.
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Corvus Systems, Inc.
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Creighton Development, Inc.
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Enterset
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ExperTelligence
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General Computer Company
Haba Systems
Hayden Book Company
Hayden Software

Hayes Microcomputer Products
Hippopotamus Software
Icon Publishing
ICON Review/Mindwork
Infosphere, Inc.
InfoWorld
Innovative Technologies/
Communications
Intermatrix, Inc.
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Iomega Corp.
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Kraft Systems
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Odesta Corporation
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Palantir Software
Paradise Systems, Inc.
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Supplies
Peripheral Systems
Personal Computer Peripherals
Prometheus Products, Inc.
ProVUE Development Corp.
Queue, Inc.
Scott, Foresman & Co.
Servidyne Micro Systems, Inc.



Sierra Information Systems
Silicon Beach Software
Small Business Computers of
New England
SoftTech Microsystems
SoftIdea
Software Arts, Inc.
SoftWeave
Softworks Limited
Stoneware
Sunol Systems
Systems Control
Tecmar, Inc.
Telos Software Products
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**MACWORLD
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BOSTON

A Physicist, a Mac, and a Death Star

Robert Buderl

The fog hangs heavy over the Berkeley hills on a Saturday morning. Above the sprawling campus of the University of California, the armed guard at the Lawrence Berkeley Laboratory (LBL) gate stays huddled inside her booth, scribbling out a visitor's pass for Building 50. The institutional, earth-tone structure, an early attempt at blending architecture into its terrain, is perched almost directly above the guard post. On a less foggy day the Golden Gate Bridge would be visible across the bay to the west.

No one seems to be in Building 50. But up half a flight of stairs and down a long, linoleum-paved corridor, a door is open on the left, leading the way to the three-room astrophysics office. In the westernmost room are books strewn haphazardly on shelves and papers piled high on desks and chairs. In the middle of all the printed matter, a lone Macintosh computer whirs. On its screen five small, round objects rotate around a bigger round object. Farther out a seventh orb travels in circles around them all. The only clue to the meaning of the screen display is the program's name: Nemeſis Simulator.

Hovering over the Mac, a Three Mile Island Memorial Coffee Cup in hand, is physicist Rich Muller, his persona an extension of the cluttered room. Later, after a lengthy discussion about his severely rumpled style of dress, Muller called me at home to say that pilgrims to Mecca wear old clothes as a sign of humility; he then sang—in German—the chorus from “The Ruins of Athens,” a masque about the pilgrims, and finally proclaimed, “My clothes aren’t rumpled by physics standards.” The 41-year-old Muller is a world-renowned scientist who tempers his view of life with witty catchalls and a strong sense of humor. A self-proclaimed Macintosh freak who jokes about things being either “pre-Mac” or “post-Mac,” he keeps a 128K memory board stuffed in a box in his crowded study because “like the HP-35 calculator, it’s a real keepsake.”

In 1978 Muller received the National Science Foundation’s Waterman Award, a \$150,000 research grant given to top scientists under 35 years old. That same year, he received the Texas Instruments prize presented to the year’s preeminent scientist or engineer. And four years later he received the coveted MacArthur grant—\$180,000 awarded tax free and with no restrictions. Muller could do whatever he wanted with the money; he was told that he need not even send a thank-you letter. The award allows you, he notes, “to do what you’ve always wanted to do. Well, I was doing what I wanted to do, and I liked my job.”



Did a cosmic phenomenon cause the extinction of the dinosaurs? A Macintosh is helping physicist Richard Muller find out.

Nemesis

One of Muller's most significant scientific accomplishments was coming up with the first accurate measurement of the earth's velocity through space (around 1 million miles per hour, depending on when you measure), but he is best known as the force behind Nemesis, a.k.a. the Death Star. Muller leads a team of scientists in search of a star—thus far hypothetical—believed to be the cause of comet showers on the earth every 26 million years or so. Such a hail of comets has the potential to render most life-forms extinct.

● ● ● ● ● *A self-proclaimed Macintosh freak, Muller jokes about things being either 'pre-Mac' or 'post-Mac.'*

The select team is an assemblage of graduate students and professionals; often in attendance are such notables as Nobel laureate Luis Alvarez, U.C. Berkeley geologist Walter Alvarez (Luis's son), and eminent nuclear chemist Frank Asaro. The meetings, held in the easternmost room of the astrophysics office, are a hodgepodge of updates, brainstorming, and technical problem solving in which terms of higher mathematics and properties of light waves are casually bandied about.

Muller's Nemesis star may seem farfetched, but it is an outgrowth of a now generally accepted theory put forth by his mentor and LBL colleague Luis Alvarez. Like Alvarez, Muller has been catapulted from the typically less turbulent realms of subatomic particles and cosmology into a controversy that has raged on the Berkeley campus for nearly six years—the debate over why numerous life-forms became extinct at approximately the same time in the earth's history.

The Alvarez theory arose when Walter discovered a worldwide layer of iridium in the geological record of some 65 million years ago, the boundary between the Cretaceous and Tertiary periods. Iridium, one of the platinum group of elements, is rarely found close to the earth's surface and is generally associated with meteorites and comets. Along with Asaro and fellow LBL nuclear chemist Helen Michel, who together confirmed the iridium anomaly, the Alvarizes proposed a fantastic scenario: around 65 million years ago a giant

asteroid slammed into the earth, raising a huge dust cloud that blocked sunlight and prevented photosynthesis. The event, in which some 70 percent of existing species died out, was one of several mass extinctions in the earth's history. This cataclysm, the scientists said, would have affected all life-forms, especially marine and land animals, including dinosaurs.

Criticism was rampant, but the Alvarizes stood fast, and evidence has slowly accumulated in their favor. Muller was fascinated when he read a report by paleontologists at the University of Chicago who reviewed the past 250 million years and concluded that mass extinctions occurred in regular, 26-million-year intervals. Recalls Muller, "I thought there must be some astronomical explanation."

He applied himself to formulating an astronomical model of periodicity that would explain the phenomenon. Often he would walk around the corner and down the hall from the astrophysics department to the roomy corner office of Luis Alvarez. There, in the shadow of Alvarez's immense transparent star dome, he used his mentor as a sounding board. "He didn't believe in periodicity, and I did," Muller says, "so I started looking for explanations, with Luis acting the devil's advocate."

One of Muller's ideas is that the catalyst for the periodic global destruction is an undiscovered companion star that orbits the sun every 26 million years. The concept is logical enough—two-thirds of known stars have companions—but Muller couldn't see any way such a star could let loose the asteroid storms postulated by the Alvarizes.

During Christmas break in 1983, Muller discussed the problem over espressos with astronomers Marc Davis of Berkeley and Piet Hut, who was visiting from Princeton. Hut listened intently to Muller's summary and suggested that instead of asteroids, the companion might trigger a rain of comets. After all, the existence of a theoretical band of comets called the Oort cloud has long been accepted by astronomers. Consisting of billions of comets, the cloud is thought to ring the sun from as close as just beyond Pluto to more than 100,000 astronomical units—the distance between the earth and the sun—away. If the companion star passed through the thickest part of the cloud every 26 million years or so, its gravitational force would send millions of the heavenly voyagers flying in all directions, and some would undoubtedly strike Earth. The three men grew excited. Muller recalls, "We wrote the first draft of our paper that day."



Nobel laureate Luis Alvarez and his son, geologist Walter Alvarez, behind the immense star dome that dominates the senior Alvarez's office.

The scientists spent the next week double-checking calculations and fine-tuning the paper for submission to the British science journal *Nature*. Muller took the opportunity to give the companion star a name. Rummaging through a book of folklore and mythology, he considered Kali, the Hindu goddess and destroyer of humans and animals; Indra, a Vedic goddess of storms and war who sent a thunderbolt (a comet) to

● ● ● ● ● *The catalyst for the periodic global destruction is an undiscovered companion star that orbits the sun every 26 million years.*

slay a serpent (the dinosaurs); and George, the saint who slew the dragon. Muller's final choice was Nemesis, after the Greek goddess who relentlessly persecuted the rich, the proud, the powerful, and any others that became too godlike.

The Nemesis Simulator

Back in his office, Muller is smiling over the simplistic version of his theory depicted on the Mac screen. The five small bodies on screen, he explains, represent comets in the Oort cloud rotating around the sun. The solitary orb is the Death Star. As it passes close to the sun, it moves through the Oort cloud and sends comets hurtling toward the solar system. Muller wrote the program in half an hour in Microsoft BASIC and spent a week refining it. The fact that he wrote the program at all marks a dramatic switch in his attitude toward computers. As a graduate student Muller came to hate them. He talks in horrified terms about "dumps," "hexadecimals," and thumbing through stacks of cards trying to spot a programming glitch. He remembers the stuffy keypunchers who wouldn't give his projects priority and considers keypunchers "worse than computer programmers in terms of being totally obnoxious."

The Macintosh changed all that. Muller keeps one at home and another in the office, cultivates user grapevines, and writes reviews for the Berkeley Macin-

tosh user group. His desk at home is occupied by nearly 100 disks, including 40 commercial programs and practically all the public-domain software in existence. And all his post-Mac Nemesis work—including scientific papers and the article he wrote for the *New York Times* magazine—has been done on the machine.

One day Muller was in his inner office chatting with Luis Alvarez, when his long-awaited copy of *Sargon III* arrived. He ripped open the package, plopped the program in the computer, and began a game, ignoring the instruction manual. As a small crowd gathered and urged Muller on to victory, Alvarez watched dumbfounded. He had never seen a computer that made applications so simple. "I was totally impressed," Alvarez says. "I've used a lot of computers, and you have to spend a week or two studying the manual before you can do anything."

Last October Muller upgraded his Mac to 512K. The physicist gathered three of his graduate students to help install the new board. "We weren't going to call in any technician. It was an opportunity to open up the Mac," he says. The scientists-turned-hobbyists were not discouraged by the deeply recessed screws and the unusually shaped heads. They removed five screws from the back of the machine and tugged. When the case wouldn't budge, they discussed the situation and decided that the five screws were all there were. They gave the case a yank. It worked, and the upgrade was installed. In typical fashion, Muller filters the experience through the eyes of a physicist—the Macintosh is just another universe to unravel. "Taking apart the Mac is a little bit like exploring the atom," he says. "You don't know what you're getting into, and you have to have some degree of confidence that you won't do any irreparable damage." □

● ● ● ● ● ● ● ● ● ● ● *Robert Buderer is a reporter for the Time-Life News Service.*



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Now you can turn any printed image into a detailed, high-resolution Macintosh graphic.



Just roll your original into your ImageWriter.



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No doubt about it, Macintosh is one great graphics machine. But until now, Mac graphics have been limited to what you can draw with a mouse and what someone else has put on a disk. Consequently, taking full advantage of Mac's graphics capabilities has been tough. But now there's ThunderScan. The new optical scanning device that lets you feed your Mac a steady diet of graphics that are useful to you.

ThunderScan turns Mac's ImageWriter printer into an image reader. So you can digitize any printed image and turn it into a detailed, high-resolution MacPaint document. Anything, including forms, half-tones, photos, mechanical drawings, maps, floorplans, logos, signatures and more. From black and white and color originals. ThunderScan reproduces them at over 200 dots per inch and in 32 shades of gray.

ThunderScan's application software, written by Mac-team-member, Andy Hertzfeld, makes it an extremely versatile and useful tool. You can gen-

erate full-page images or selected parts of them. Enlarge and reduce them. Manipulate them. Control the contrast and brightness. Create your own personal image disk. "Cut" and "paste" images together, creating new documents. And print them out on your ImageWriter. Or send them by modem to another Mac. The possibilities are nearly endless.

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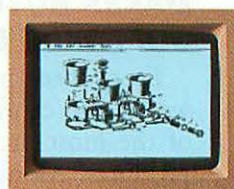
What you see here is the complete ThunderScan system. You don't have to buy an expensive video camera. Just pop out your ImageWriter's ribbon cartridge, snap in ThunderScan and you're set. It can even work in the dark (maybe you can think of an application for that).

If you bought a Mac at least partly for its graphics, only to find you couldn't take full advantage of them, now you can. With ThunderScan.

At an introductory price of just \$229, it's a small price to pay for a whole new graphics capability.

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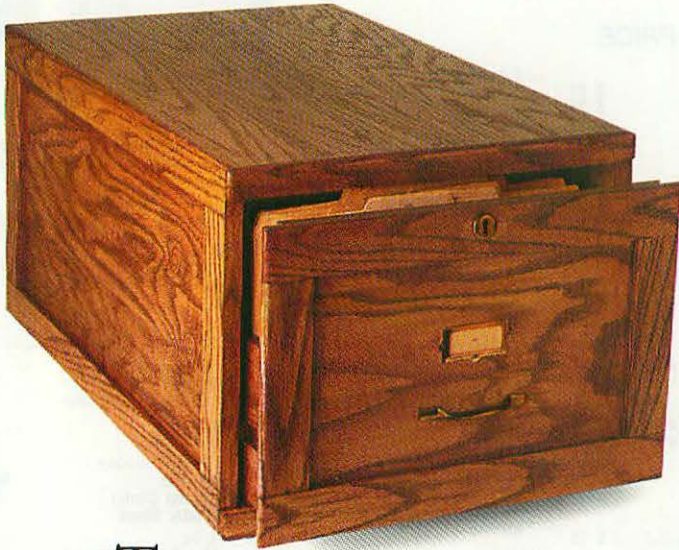
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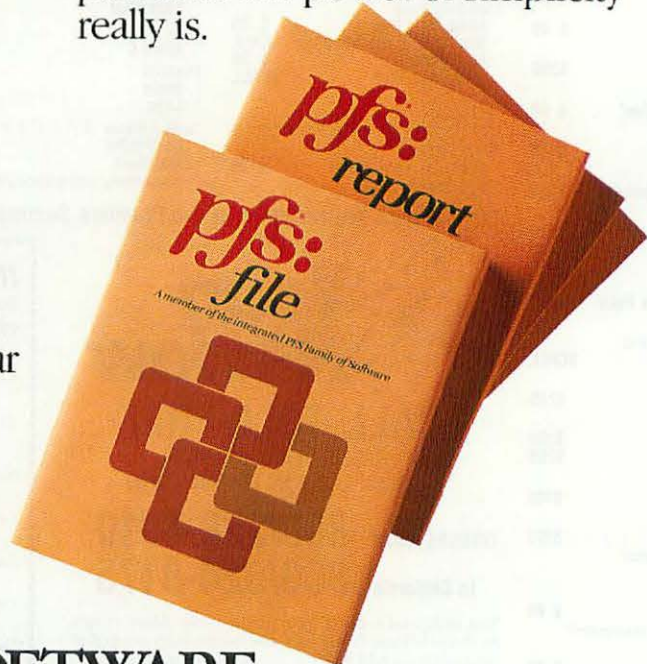
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Macware Reviews

Edited by Erfert Nielson

Two home accounting programs, an action game, strategies for making your first million, and a program that makes the Mac talk

In response to reader requests for more reviews, Macworld has added a new section, Macware Reviews. Each month this department will feature brief reviews of Macintosh hardware and software, from arcade-style games to accounting packages and printers. Write to Macware Reviews and let us know what programs you'd like reviewed.

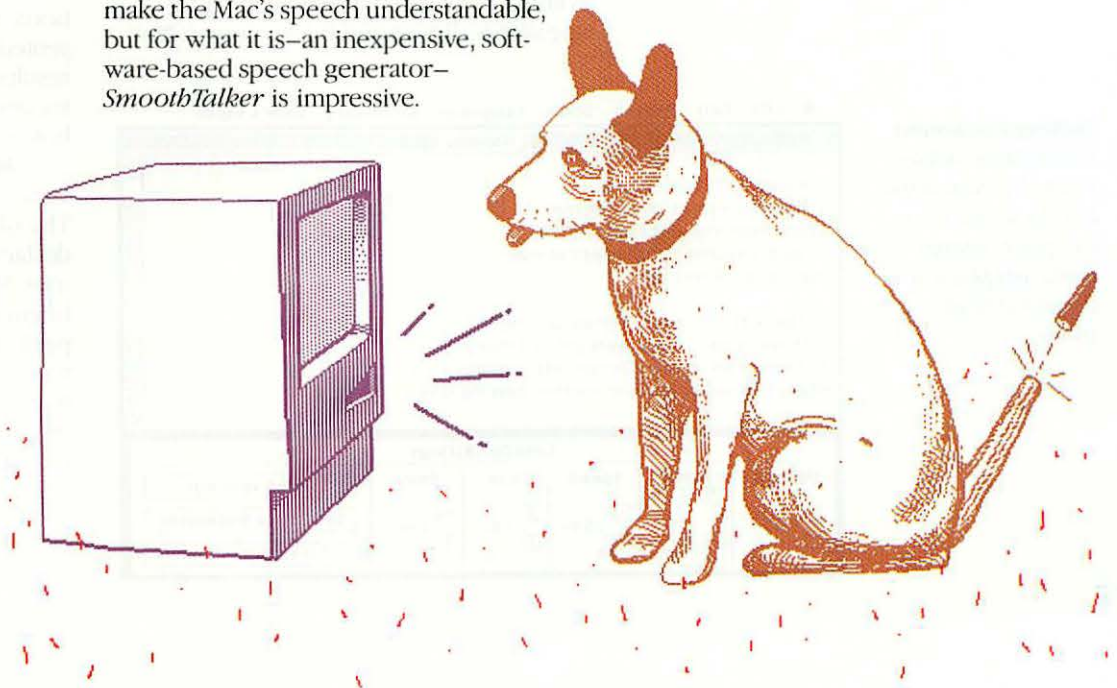
The Mac Talks Back

Speech is the easiest, most natural form of human communication. The written word has its advantages, but most people's phone bills far outweigh their expenditures for postage stamps. It follows that people would like to extend this preference for speech to their interactions with computers. Science-fiction stories abound with computers that listen to spoken commands and respond politely in suave, synthesized tones. The Mac cannot yet respond to your verbal commands, but it can now talk to you.

SmoothTalker, by First Byte, gives you an easy way to generate speech with the Macintosh: you type English text at the keyboard, and the program causes the Mac to "say" the words through its built-in speaker. You often have to make adjustments in inflection and pronunciation to make the Mac's speech understandable, but for what it is—an inexpensive, software-based speech generator—**SmoothTalker** is impressive.

When you start up **SmoothTalker**, you can choose one of the program's existing demos, open the application itself to compose a new document using **SmoothTalker**'s text editor, or open **SmoothTalker** and load a text file from any Macintosh program that can save data as a text file (**MacWrite** or **Microsoft Word**, for example). You can also transfer blocks of text from other programs to the Clipboard or the Scrapbook—each automatically saves data as text files—and paste the text into a **SmoothTalker** document.

You'll first encounter **SmoothTalker**'s speaking abilities when you select About **SmoothTalker** from the Apple menu. A typical dialog box is displayed, but then the program speaks the text of the dialog box (perhaps it should be called a monolog box in this case).



Once text has been typed or loaded into *SmoothTalker's* document window, you can test and modify the generated speech. The Speech menu commands tell the program to "say" either a selected portion of the document or the entire document.

Dictionaries and Diction

SmoothTalker compares the text in the document window to the words in its dictionary. It then interprets the syntax by applying more than 1000 conditional instructions to the text. For example, the program adjusts the inflection of a phrase upward if it is followed by a question mark. *SmoothTalker* also correctly translates common abbreviations and speaks the complete word or phrase; for example, *Mr.* is pronounced *mister*. Not many people know what to call the number 999,000,-000,000,000,000,000,000,000,000; *SmoothTalker* does.

Language, however, is very complex, and every rule has an exception. When you need to adjust *SmoothTalker's* speech, two options are available. The first is a set of controls called Speech Settings. When you choose Show Speech Settings from the Speech menu, you can adjust the volume, pitch, speed, tone, and voice. At the time of this review only a male voice was available, but a First Byte representative informs me that a female voice will be included in version 2.0, which registered owners of version 1.0 will receive at no charge.

The second option for fine-tuning *SmoothTalker's* speech is the Dictionary menu. You can control the pronunciation of

unusual words by storing exceptions to *SmoothTalker*'s interpretations of correct pronunciation. Up to 50 such exceptions can be stored in the dictionary. You note exceptions by identifying the text that requires special attention and then attaching either a corrupted English spelling that produces the right pronunciation or a phonetic spelling that *SmoothTalker* can speak without interpretation. *Chihuabua*, for example, can be specified as "cha waw waw" in corrupted English or as "CHAX-wAAwAA" in phonetics. A list of phonetic symbols is provided in the User's Guide menu (see "Talking Document").

Adding Speech to Programs

A First Byte spokesperson says that version 2.0 of *SmoothTalker* will allow programmers to incorporate speech into non-commercial programs. The *SmoothTalker* master disk must be inserted when the program calls the *SmoothTalker* speech.

A version of *SmoothTalker* for developers, which allows programmers to incorporate speech into commercial applications, is also available. Software developers receive a special set of documentation and software routines that link *SmoothTalker* to the Lisa/Pascal programming environment. First Byte also plans to allow programmers to add speech to programs written in Microsoft BASIC 2.0 and Creative Solutions' MacFORTH.

Sound Quality

Sound generated on the Macintosh, whether music or speech, is restricted to the performance capabilities of the speaker and the audio circuits. Speech coming from the Mac's small, built-in speaker is distorted at high volumes. No

software can overcome these hardware limitations. Using an external speaker connected to an amplifier via the Mac's speaker jack greatly improves sound quality. First Byte is also working with developers to produce a series of filters to reduce distortion and further improve the program's sound.

SmoothTalker allows you to produce reasonably understandable speech by typing English text. This feat is a significant achievement that exemplifies the sound capabilities of the Mac. Potential applications might include spoken help messages in programs, talking terminals for the visually or vocally handicapped, voices incorporated into games, and educational programs that speak to students. —*Tom Neudecker*

SmoothTalker
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List price: \$149.95

Fun and Games in the Corporation

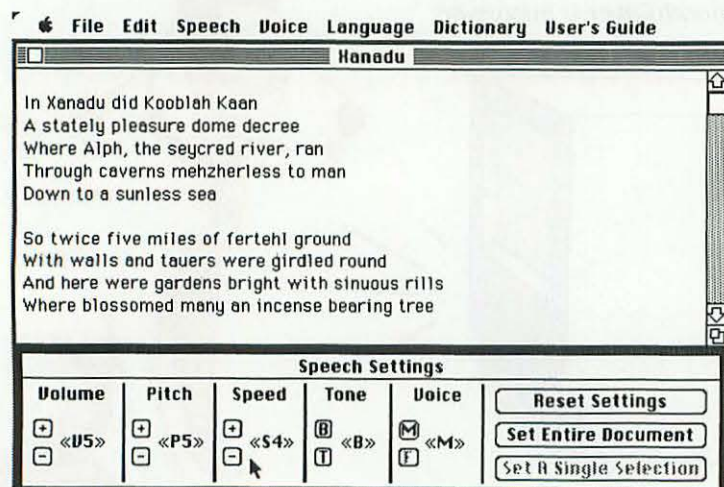
You know the old joke about what bus drivers do on their days off—they ride buses. What about executives? Well, they play business simulation games. Yes, this is the 1980s—the decade of business, the MBA, and entrepreneurship.

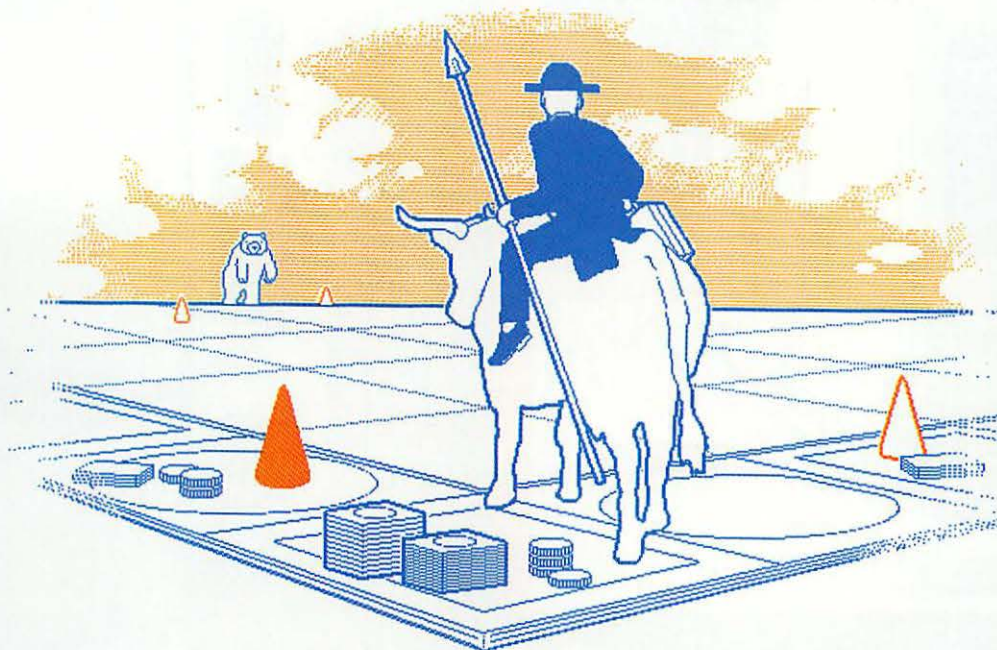
Business simulation games present scenarios that mimic actual business situations. You evaluate the information presented to you, make decisions, and see the results of your decisions. Not surprisingly, success in these games is measured by how much money you make.

Millionaire, from Blue Chip Software, is a simulation of the stock market. The object of the game is to make a million dollars by trading 15 stocks in five industries. You start the game with \$10,000 and begin in the 14th week of a 91-week trading period. As your net worth increases, so do your investment alternatives. Until your net worth reaches \$12,000, you can buy stocks only at full price. When your net worth reaches \$12,000, you can buy on margin,

Talking Document

SmoothTalker allows you to fine-tune a spoken document using the Speech Settings menu and phonetic or corrupted English spellings.





which means that your broker will lend you up to 50 percent of a stock's purchase price—at a hefty 18 percent interest rate, of course.

When your net worth hits \$18,000, you can increase your leverage even further by buying call options. A call option gives you the right to purchase a stock at a price previously agreed upon. If you think the price of a stock will rise significantly during a specified period of time, you can speculate on it by buying a call option. When your worth reaches \$40,000, you can also buy put options. This type of option gives you the right to sell a stock at a price previously agreed upon. For example, if the game's Apple Computer stock is selling at \$50 in July, and you think the price will drop below \$45 in September, you can buy a put option at \$45 that expires in September. If Apple is selling at \$38 in August, you can make a healthy profit by selling your Apple stock options. Finally, when your net worth reaches \$100,000, you can borrow up to 80 percent of your net worth.

Reports

Before deciding which stock to buy or sell, you need to do some market research (see "The Trading Zone"). *Millionaire* provides you with information on stock market trends and on your specific holdings. Extensive reports begin with a simple 36-week graph of the activities of all 15 stocks and a graph of price fluctuations in one of the five industries.

A financial journal offers news of the week. Stories for one week told that American Motors earnings increased while Ben-

dix decreased, there was high trading volume in U.S. Steel stock, and Control Data had a plant fire that would interrupt shipments. The headlines are taken from actual stories in the *Wall Street Journal*. As in the real world, news stories sometimes have a direct effect on a stock's price.

You can get a separate graph of the price activity of each stock that you own and a chart showing each stock's historical high and low, the week's closing price, and the net price change for the week. You can also check the current status of your portfolio. A chart tells you what stocks you own, the average price you paid, the current stock price, how much you gained or lost, and how much equity you have in stock that you bought on margin.

The Bottom Line

You probably won't buy or sell stocks on a weekly basis, since you have to pay your broker a 1.5 percent commission for each transaction. If the market is down but you can't sell put options, you can do little but hold on to your money until market conditions improve. One weakness of this simulation is that you can't collect interest on unused cash—something any investor would be doing.

The game continues for the 91-week period, but it will take many games for you to reach the goal of \$1 million. You can save current holdings at any time during a game. At the completion of a game, the program remembers your current net worth until the next game.

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How to Keep Your MacintoshTM from Frying to a Crisp

Protecting Your Hardware From The 6,000 Volt Destroyer

Over 50% of all hardware and software complaints received by manufacturers have nothing at all to do with product quality. To the contrary, most damage reported is caused by surges in household or business current.

These surges continually degrade sensitive microcircuitry resulting in lost data and, even worse, computer repairs that are often mistakenly blamed on original equipment failure.

30,000 Volts At The Tip Of Your Finger

Another common danger to the computer, its peripherals and software, is static electricity. Few people realize that their bodies can carry as much as 30,000 volts of static.

The discharge of static electricity through the operator's fingertips can pose just as great a threat to your system as power line surges.

The Faulty Ground

In addition to operator safety, a properly grounded computer is better able to drain off charges that would otherwise create dangerous voltage levels between the computer's chassis and microcircuitry. Again, the operator is typically not aware of whether the outlet is properly grounded and therefore risks both the operator's safety and hardware damage.

RFI Can Play Havoc With Your Image

While RFI (Radio Frequency Interference) is not a source of damage to computer or operator, it can play havoc with the monitor image and to software. RFI is caused by nearby radio stations, the operator's own radio or television, as well as other electrical devices. RFI shows up on the monitor as a scrambled image and may also appear as data that has been garbled while in memory. If for no other reason, the computer operator should guard against RFI simply because its effect can nullify the time saving benefits provided by the computer.

MacGard: Real Protection For The Serious User

MacGard from Systems Control is the single most complete computer protection device available today. From its inception, MacGard was designed with Macintosh in mind. From its quality injection molded plastic casing which compliments your Macintosh's appearance, its at your fingertips convenient placement on the side of your unit, and its combination of superior protection features, the MacGard is the ultimate system accessory for your Macintosh.

MacGard provides the serious user with a complete series of protection benefits.

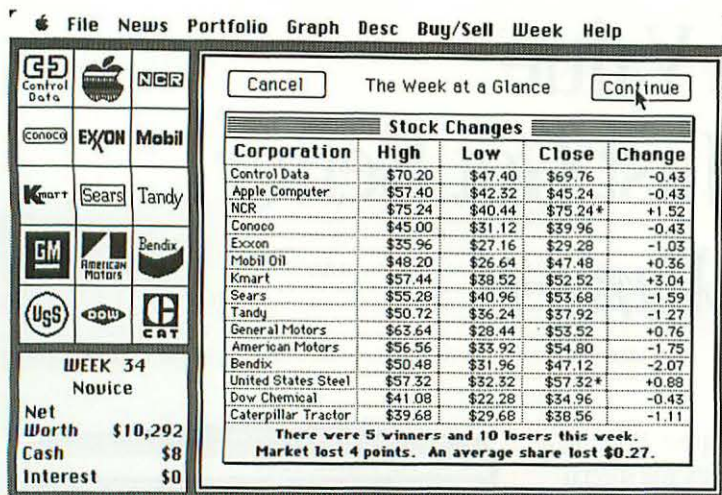
- It clamps off all line to line and line to ground surges *before* they can enter your system.
- It provides an anti-static pad you need only touch to safely drain off harmful static.
- It provides an LED light to indicate proper ground of your electrical outlet.
- It provides RFI attenuation to assure a clean monitor image and software safety.
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Like all simulations, *Millionaire's* depiction of investing in the stock market is simplistic. Few investors buy a stock based only on prices and a few headlines. You get no data about earnings, sales volume, or a company's balance sheet—crucial information for any investment. Stock price activity in *Millionaire* is not based on the actual fluctuations of the 15 stocks in the game but on a formula that simulates the price performance of many stocks. You can't even buy Bendix stock any more, since it's been bought out by Allied Corporation. In other words, you should ignore the name of a company and think in more general terms when playing the game.

As a resident of the real world, you know that the business world is incredibly complicated. Distilling numerous complex factors into the Mac's memory means that the model of reality presented in *Millionaire* is rudimentary; still, the game teaches you basic lessons in stock trading that you'll probably enjoy learning. —Saul D. Feldman

Millionaire
Blue Chip Software
6744 Eaton Ave.
Canoga Park, CA 91303
818/346-0730
List price: \$59.95

Transaction-Packed Accounting

I always avoided home accounting programs because I didn't want to rush home every time I put a nickel in a parking meter to enter the transaction on my computer while the event was fresh in my mind. But I like to think I have an open mind, so I took a look at the new Macintosh version of *The Home Accountant and Financial Planner*, a financial management and planning program that has been available on other computers for years.

The Home Accountant helps you monitor your personal earnings, expenses, investments, savings, and debts in much less time than you would take by hand. The program can better prepare you for tax time or any other time you want to know where your money comes from and where it goes. You can also use the program to budget your income and expenses and to compare budgeted amounts against actual amounts. *The Home Accountant* also helps you plan loans, investments, and retirement. To use the program, you need a 128K Mac with an external disk drive. The program works with a single-drive 512K Mac, but using an external drive is more convenient, since you must put your files on a data disk.

Tracking Your Transactions

The Home Accountant keeps track of up to 200 accounts, including bank accounts, credit cards, cash, assets, liabilities, income, and expenses. When you spend money, receive money, or otherwise change the value of an account, the event is called a *transaction*. *The Home Accountant*

The Trading Zone Millionaire's simulation of the stock market is simplistic in comparison to the real world, but you'll learn how the stock market works and perhaps earn your first million.

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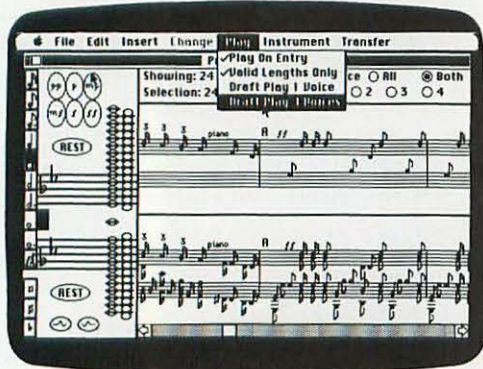
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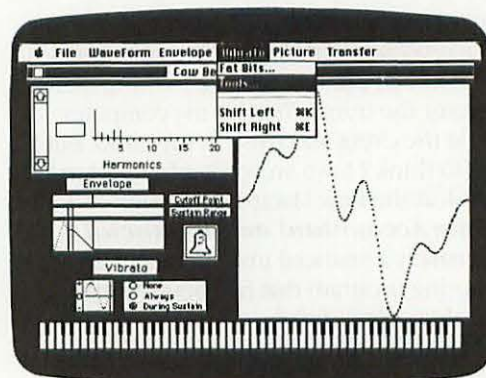
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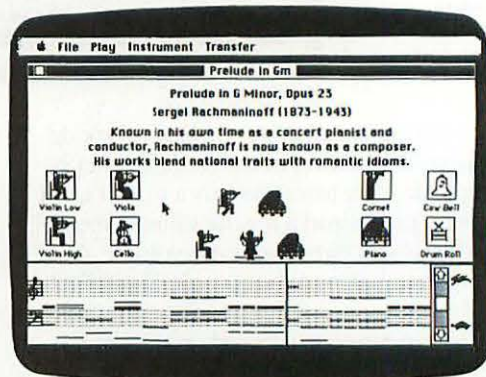
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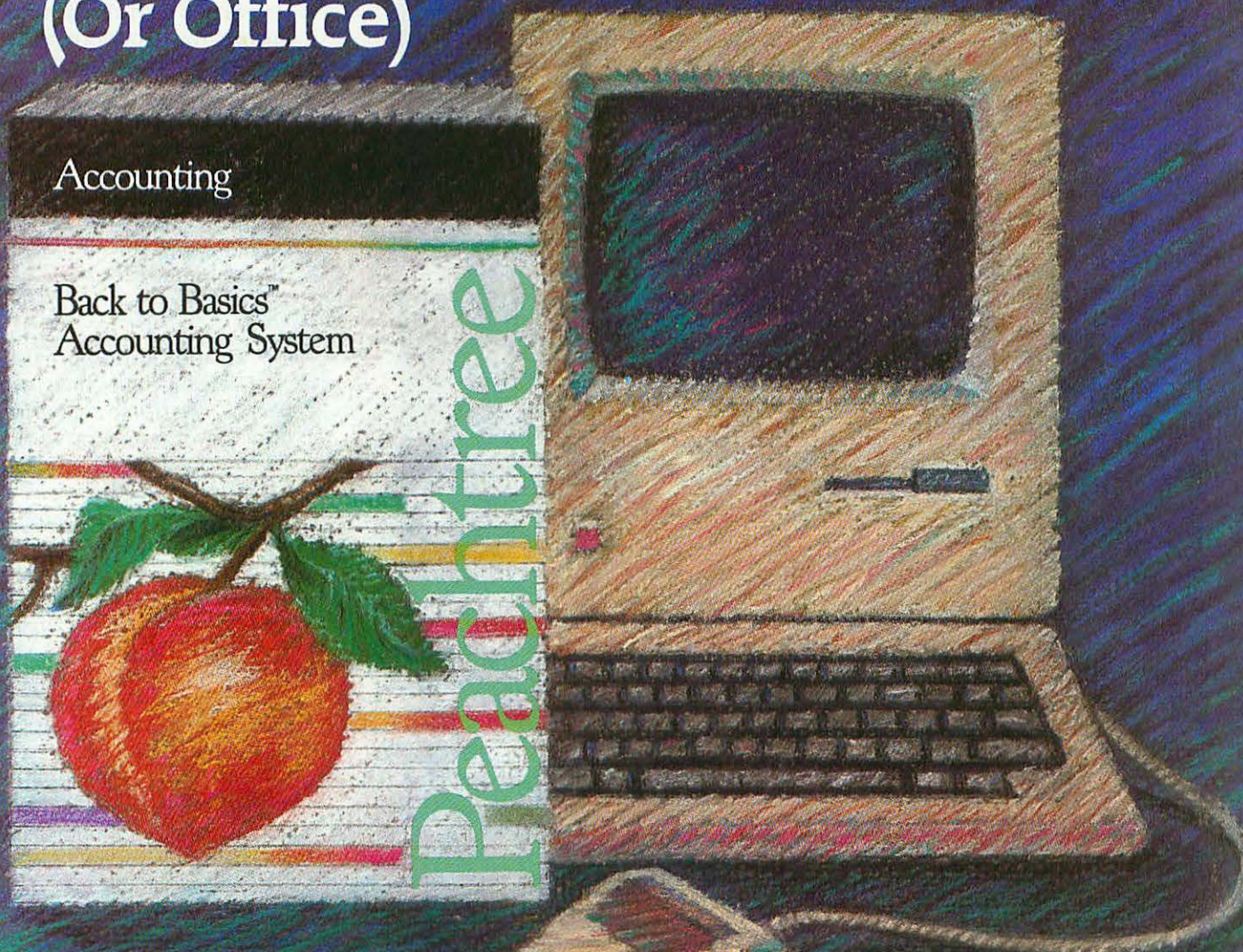


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The C for the Macintosh

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(Computer Languages 4/85)

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tant stores 3000 transactions per disk, and the amount of one transaction can be split among eight accounts. For example, your home mortgage payment may go to interest, principal, homeowner's insurance, and property tax. You can further classify any transaction with a 2-character code, which enables you to perform tasks such as determining joint checking account activity by person or separating gas costs by car.

The program handles as many as 50 transactions automatically. You set up in advance which account is affected, how much is involved, and on which day of the month and in which months the transaction should occur. The program notifies you at the beginning of a session if any automatic payments are due.

Graphs and Reports

When it comes time to analyze your finances, *The Home Accountant* can print or display seven reports and four graphs. The reports range from a balance sheet to a list of names of those with whom you deal regularly. The program can also print checks on standard preprinted forms (a sample comes with the program). The graphs don't show any facts that aren't in the reports, but they do make it easier to see trends and patterns. You can specify the type of information you want included on any report or graph. For example, you could specify a report that listed only tax-related transactions.

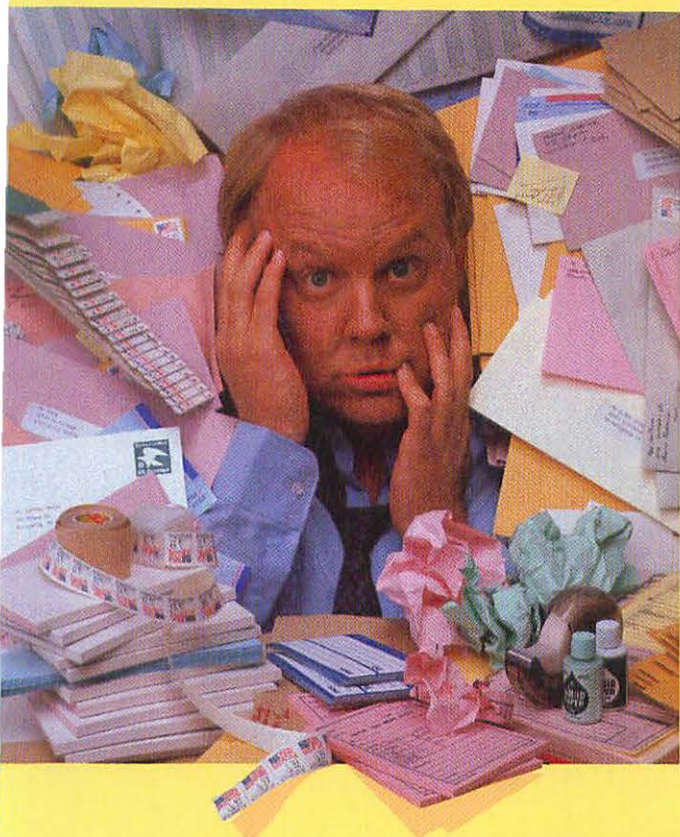
The Home Accountant's loan, retirement, and investment planning features are somewhat disappointing. Loan planning doesn't handle variable-rate loans, and the yearly interest totals I got didn't match the totals that my banks gave the IRS. Retirement and investment planning are complex matters that this program treats very simplistically. For example, the program accommodates only single rates of return and inflation and doesn't figure in tax breaks from investments such as IRAs.

The Home Accountant makes good use of the Mac's graphic user interface. Its eight menus list commands that open dozens of windows. It's not unusual to have six windows open at once (see "Financial Windows"). Most of the information you need to enter a transaction is listed in one window or another, and you can copy

(continues on page 154)

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In September MACWORLD Brings *Jazz* and *Excel* Face to Face

Macworld's September issue features in-depth reviews of Lotus's eagerly awaited *Jazz* and Microsoft's mighty *Excel*. We compare these integrated programs spreadsheet to spreadsheet and cover each database to help you select the better match for your business computing needs. Also, interviews with Bill Gates of Microsoft and Mitch Kapor of Lotus add insight into how these powerful programs enhance the furnishings of the Macintosh Office.

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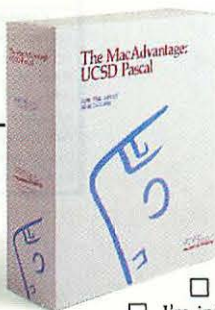
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(continued from page 150)

information to the transaction by pointing and clicking instead of typing. However, the program has no Undo or Show Clipboard feature and can't share data with a spreadsheet or database.

Besides the program disk, *The Home Accountant* includes a 178-page manual that is easy to read and adequate in scope but tends to explain more about which buttons to push and less about how to apply the program to your finances.

You don't need this program to balance your checkbook or tally the amounts on Form 1040A. But if you are fiscally lost and willing to spend considerable time entering your financial transactions, *The Home Accountant* will reward you with comprehensive reports and graphs that will help you better understand and manage your finances. —Lon Poole

*The Home Accountant and
Financial Planner*
Arrays/Continental Software
11223 S. Hindry Ave.
Los Angeles, CA 90045
213/410-3977
List price: \$150

Financial Windows

The Home Accountant lets you display several windows at once and transfer information from one window to another.

The screenshot shows the 'Credit Cards--Gas' window. The 'Name' list on the left includes McGraw-Hill, PG & E, Sprint--business, Sprint--personal, State S & L, Union 76 (selected), Valley Federal, and Water company. The main form fields are: Date (04/21/85), Merchant (Union 76), Memo, Category (Auto Expenses), and Balance (20.32). A 'Credit Charge' of \$17.80 is shown. Below the form are 'Save', 'Quit', and 'Split' buttons. At the bottom, there are two tables: 'Categories' and 'ID Codes'.

Category	Type
1st Fed. joint account	Bank Account
1st Fed. money market	Bank Account
>Misc. In	Income
>Misc. Out	Expense
Adjustments	Expense
Auto Expenses	Expense
Bank of America	Bank Account
Bank service charges	Expense

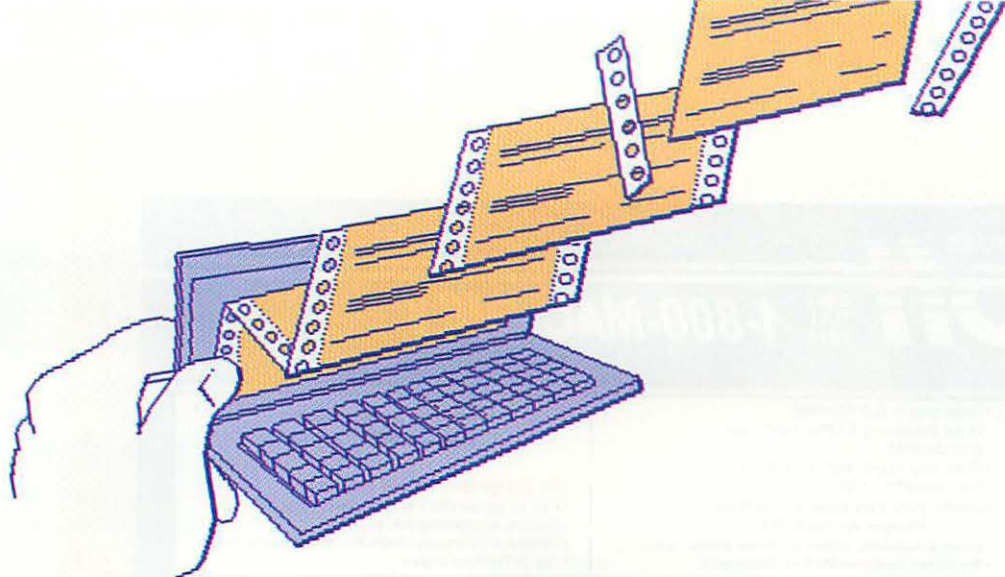
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G1	Get Info
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L1	Los Angeles 1/85
L2	Los Angeles 3/85
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Checking Out Electric Checkbook

When people first started buying personal computers, a common jest was, "You spent all that money on a computer, and all you can do with it is balance your checkbook?" Of course, computers can do more than replace a check register, and kidding aside, checkbook programs on most personal computers have been popular.

A checkbook program should simplify balancing your checkbook, clarify your spending habits, and list your tax-deductible expenses. Although you can adapt a spreadsheet or a database manager for those tasks, checkbook programs are more convenient. A good checkbook program should also keep track of credit card purchases, electronic banking, and that low-tech method of payment called cash.

The Macintosh now has a checkbook program of its own called **Electric Checkbook**, by State of the Art. The program is designed on the premise that you use your Mac and Imagewriter to write



most of your checks. This system creates more problems than it solves. For example, you have to purchase special checks for the Imagewriter. Although the manual allows that "there are times when it is more practical to write the check yourself by hand," it is in fact almost always more efficient to write personal checks by hand than by computer. If you're like most people, you probably don't take your Mac and Imagewriter with you to the corner grocery. If you follow *Electric Checkbook's* system, you will be burdened with two sets of checks and subsequently two check-numbering systems.

Setting Up Accounts

The program handles records for up to ten accounts. You set up an account by placing your finances into four categories: assets, liabilities, income, and expenses. You might list your house and car as assets, loan payments as liabilities, your salary as income, and rent as an expense.

If you own stocks, you may list them as assets, but unlike other checkbook programs I've seen, *Electric Checkbook* has no way to calculate a stock's current value. You must multiply the number of shares by the stock's current price and enter the result.

Once you set up your finances, you enter information about check payments and other transactions. This process is more complicated than using your checkbook because you must use one procedure for entering checks and another for entering deposits, withdrawals, and other transactions. Both procedures complicate entering

checks and transactions by forcing you to complete unnecessary steps. These difficulties were evident when I tried to enter a number of checks.

You enter a check by typing the payee and amount in a blank check displayed on the screen (see "Electric Checkbook"). You then post the check in an expense category by clicking the box marked "Category Code." Expense categories scroll slowly by until you find the relevant category, which you click to post the check. One check can be posted to as many as five expense categories, but after posting to each category, the list disappears, so you have to recall it to continue entering data.

Furthermore, when I realized I wanted to add a new expense category while posting a check, I had to close the checking window, add the new category, and go back to entering checks. Sometimes *Electric Checkbook* requires more memory than a 128K Macintosh has available to handle multiple windows. It's my belief that a program designed for personal use should not require the additional memory of a 512K Mac to be fully functional.

Most people write checks of varying amounts to the same payees month after month. Many checkbook programs allow you to enter a list of payees and the associated expense categories, but *Electric Checkbook* does not. Finally, once a check has been written to disk, no way is available to correct it; you have to recall the check, delete it, and reenter it.

(continues on page 158)

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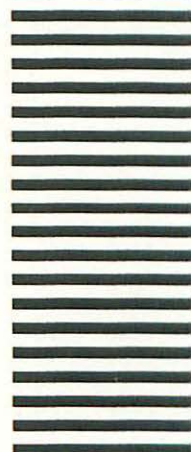
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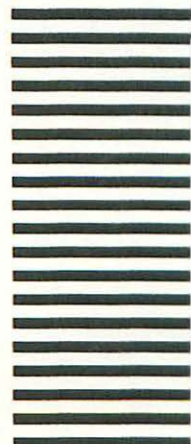
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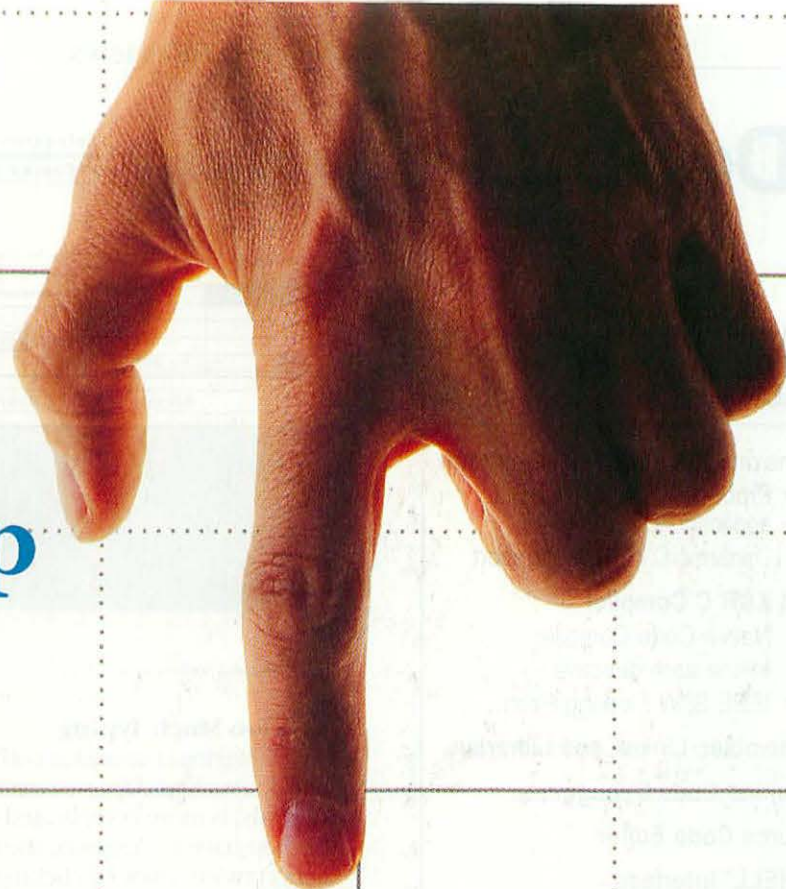
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Electric Checkbook

Electric Checkbook's design assumes you use the program to write most of your personal checks. You write checks by filling out a blank reproduction of a check on the screen.

(continued from page 155)

Too Much Typing

Entering transactions other than checks, such as deposits, interest, and withdrawals, is more complicated than it should be. You have to designate the type of transaction twice—once by clicking the category and a second time by typing the same information in the box marked "Posting Reference." Most people don't need this feature, and having to enter the same information twice only means extra work.

All transactions must have a date. Since the program assumes that it is writing your checks, it also assumes that today's date is the transaction date or that you post your finances each day. In reality, most people using the program have to delete the default date and enter a new one.

While error checking prevents you from posting an invalid date such as August 32, it doesn't prevent you from entering invalid transactions. I told the program that I was posting a deposit of \$80 to my checking account. I then categorized it as a royalty payment of \$8754.87. *Electric Checkbook* accepted it without a whimper.

No easy way exists of posting an entire month's credit card transactions. The people at State of the Art told me they had not taken credit cards into account when they wrote the program. They came up with a solution that is patchwork at best; the program limits credit card transactions to five or fewer a month.

On a positive note, the program allows you to enter your bills and see the effects of various payment schedules on your finances. Without additional work, you can print out your net worth and how much money you have spent and received in the current year. The reports are well laid out and easy to follow. The program comes

with pull-down help screens and sample accounts to teach you how to handle financial information.

Electric Checkbook was written to help average consumers make better sense of their finances; unfortunately, the program is poorly thought out. An illogically arranged manual doesn't help matters. If you want the Mac to write all your checks, you might find that this convenience outweighs the program's negatives. If you're like the rest of us and write most checks by hand, you're probably better off keeping your financial records in a shoebox until a better program is available.—Saul D. Feldman

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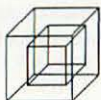
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To computer game cognoscenti, Brøderbund's *Lode Runner* has long been the standard against which all arcade-style computer games are judged. Named Best Overall Computer Software (Arcade Style) by *Billboard*, Apple Game of the Year by *Video Game Update*, and Most Popular Apple Program by *Softalk*, *Lode Runner* walked away with major software awards in 1983. Since then it has garnered devotees from all over the world.

Bricks and Booty

The game is conceptually simple but, like chess, can be extremely challenging. The protagonist, the Galactic Commando, has to maneuver around a chamber containing ladders, brick catwalks, and overhead bars and collect the Bungelings' misbegotten wealth with nothing to assist him but superior speed and a laser drill. The drill, it should be noted, is not so much a weapon as a tool: it can do nothing but blast holes in the brick walkways. These holes, however, can momentarily trap Bungelings, who are usually in hot pursuit, allowing the Commando to run over their heads to safety. Some of the booty is stashed beneath layers of bricks, requiring strategic digging by the Commando to avoid getting trapped in his own excavations. If the Commando is skillful enough to retrieve all the gold in a chamber, a ladder appears, reaching the top of the screen. Climbing this ladder brings him to the next chamber and a whole new set of challenges.

For those who wish to create their own treasure chambers, program author Doug Smith has included a Game Editor, providing the true aficionado with the ability to place ladders, bricks, bars, Bungelings, and other elements of the game around an empty screen to custom-design games (see "Building a Chamber"). Many fans who did just that sent their efforts to Brøderbund, which responded by culling the best, adding a few of its own, and releasing *Championship Lode Runner*, which consists of 50 diabolically difficult levels.

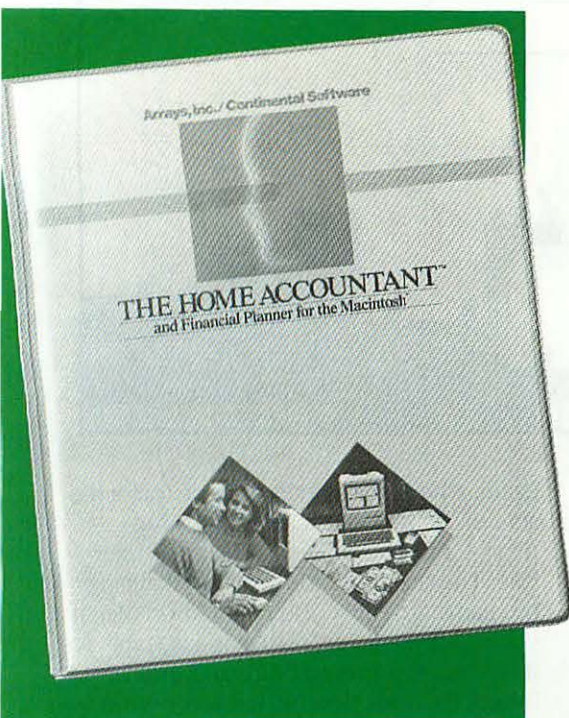
Pointer Problems

Brøderbund's *Lode Runner* for the Macintosh raises the obvious question: How well does this popular game work on the Mac? Frankly, if I were director of product design at Brøderbund, I would send this one back for some fine-tuning. First, although the mouse is not as effective as a

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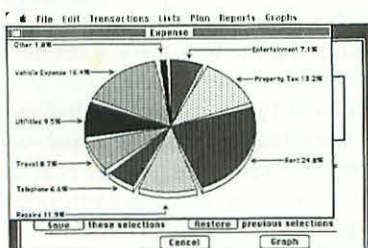
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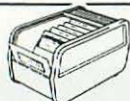
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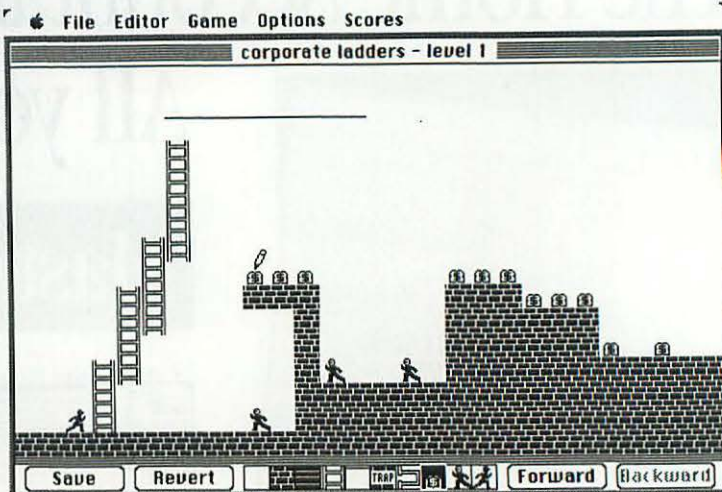
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Building a Chamber

Lode Runner's Game Editor lets you add bricks, booty, Bungelings, and other game elements to your own treasure chambers with a click of the mouse.



joystick for Commando control, that limitation in itself should not present a problem to a Lode Runner expert. The main drawback is the way the mouse works with the software—what used to be a struggle strictly between the Commando and the Bungeling guards is now also a battle between you and the pointer.

One problem is that the pointer, which is visible all the time, monitors mouse rather than Commando movement. Because Commando movement is not completely tied to mouse movement—for instance, stopping the mouse doesn't stop the Commando—who cares where the mouse is? In addition, not only does the pointer block your view of the action to some extent, but it also limits the Commando's movement. If the pointer is at the top edge of the screen, for example, the Commando cannot move any higher unless the pointer is brought back down. But moving the pointer back down also moves the Commando back down, which could spell disaster if a Bungeling is nearby. The manual's admonition to keep the pointer near the center of the screen is hard to follow; if your Commando climbs up several ladders one after the other, you often find the pointer bumping the top of the screen.

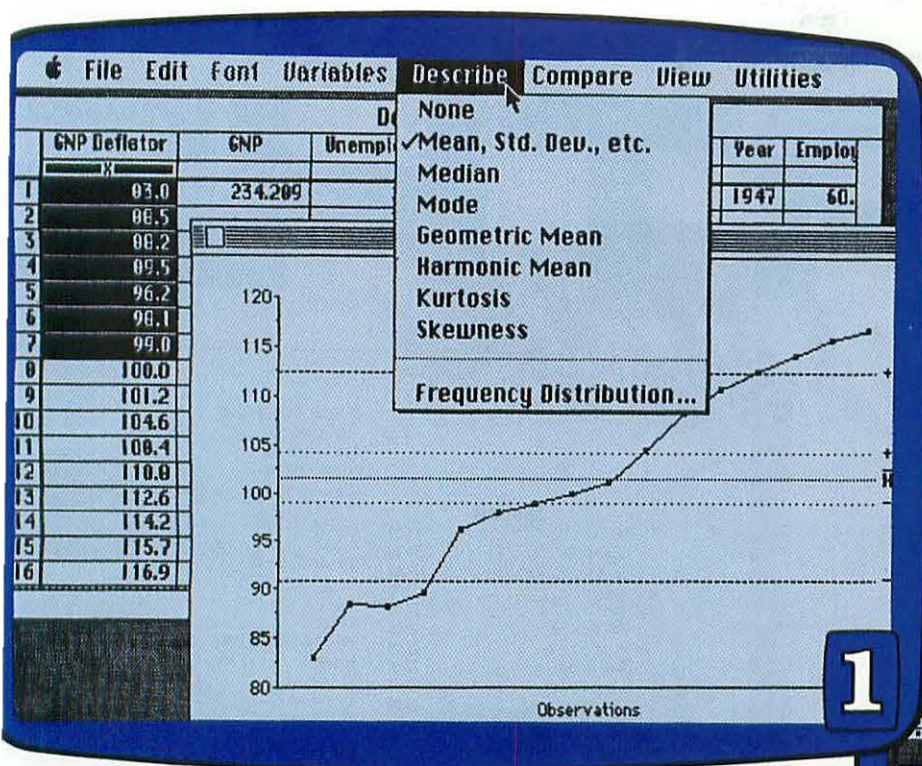
Furthermore, even the Mac's otherwise useful ability to reposition windows offers no advantage during a skirmish with the Bungelings. When the pointer is at the top of the screen, you may inadvertently shift the game window if you click the mouse to halt the Commando. The dedicated Commando has no need to move the game window during a skirmish; neither does he have any need for pull-down menus under the same circumstances. But

again, when that pointer is at the top of the screen, a click can cause menus to appear—a rather pointless (as it were) exercise. The only functions you need during the game are Pause, Quit, and Abort Man if your Commando gets stuck inextricably. As it is, you are presented with all kinds of functions, from clearing the score window to changing from mouse to keyboard control.

In short, Lode Runner's user interface could be improved. For starters, I would eliminate the pointer altogether and tie the Commando's movements more directly to the mouse, in real time. The Commando would move only when the mouse moved and stop only when the mouse did. In addition, I would disable the pull-down menus and the window-moving function during play, so as not to distract the Commando from his all-important mission.

On the positive side, the Game Editor is easily superior to the Apple II version, since the game elements can be manipulated by clicking and dragging rather than through the keyboard. Even so, once you have designed your own scenes and it's time to play, you're confronted with the same interface problems.—Nicholas Lavroff

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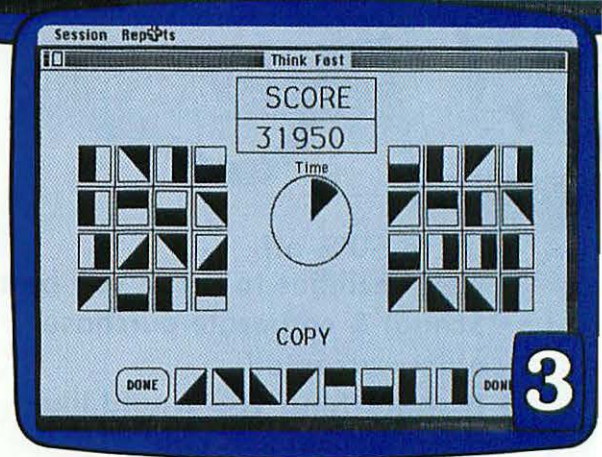
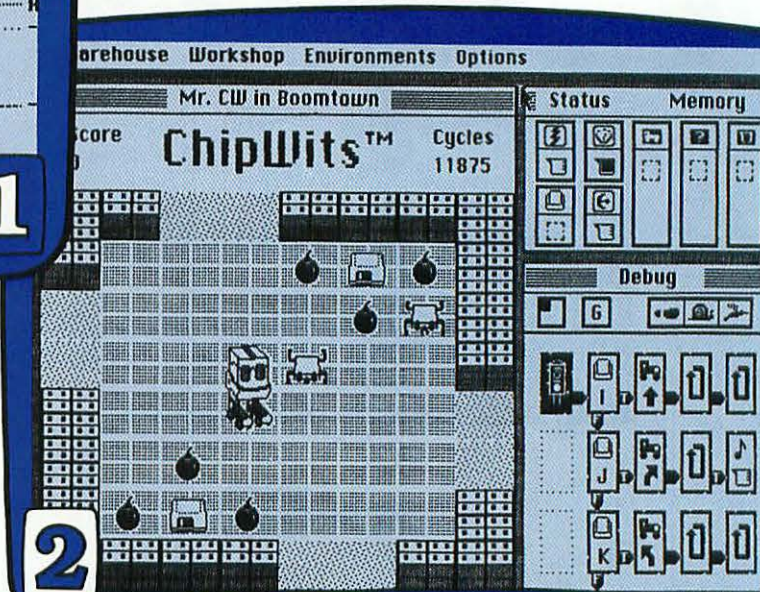


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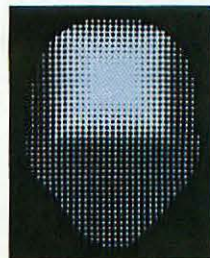
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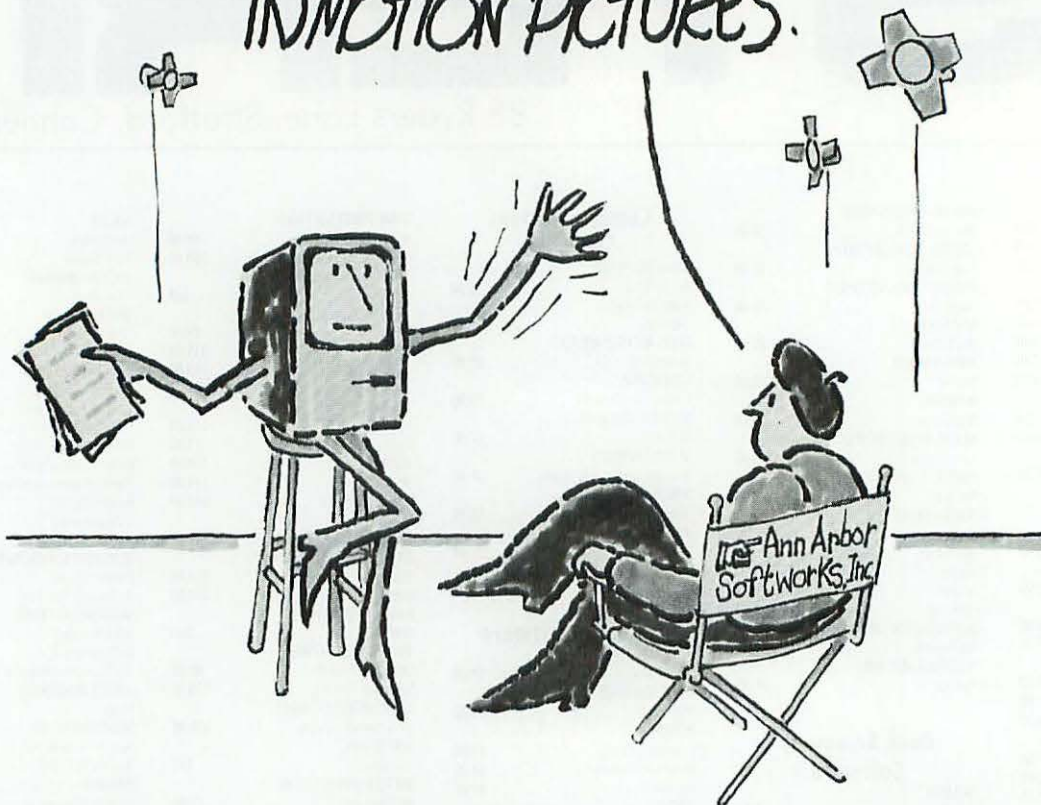
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Open Window

An exchange of Macintosh discoveries

Edited by Jim Heid

Open Window offers tips to help you use your Macintosh more efficiently. Submitted by readers, industry experts, and the Macworld staff, items in this department address all facets of Mac work, from applications to programming routines to capabilities of the Mac and software not covered in documentation.

This month's tips include a method of vertically centering text in *MacWrite*, a procedure for replacing the microswitch in the mouse, and a *MacPaint* tip for drawing small, intricate patterns and borders. Also we have an undocumented feature of Microsoft BASIC's MENU statement, an undocumented method of deleting text in *MacWrite*, and the discovery of a \$3.99 joystick extension cord that makes an ideal extension cord for any of the Mac's DB-9 connectors. Finally, we put the performance-enhanced update of Microsoft BASIC version 2.1 through a benchmark program, comparing both the decimal and binary versions to their predecessors and to Apple's Macintosh BASIC.

MacWrite Vertical Centering

MacWrite doesn't have an option to vertically center a single-page letter or memo. I use the following technique to create equal top and bottom margins.

- Remove blank lines from the top of the document until the first line of text appears directly under the ruler.

- Scroll to the end of the document and press Return to add blank lines until a page break occurs, represented by a dotted line.

- Move the pointer halfway between the last line of text and the page break, then press the mouse button and drag down to the page break, selecting half the number of blank lines.

- Cut the selected blank lines by choosing Cut on the Edit menu.

- Scroll to the top of the document, click the pointer at the beginning of the first line, and choose Paste on the Edit menu.

*Ron Yust
Joplin, Missouri*

Making the Switch

Recently my mouse died while I was writing an important report. Needless to say, when the mouse dies, so does the Macintosh; you can't do much on the Mac without it. I took the mouse apart and checked the miniature switch inside. Sure enough, the 0.1-amp, 250-volt Cherry microswitch was defective. Since my Mac's warranty had expired, I desoldered the two wires leading to the switch in hopes of installing a new one.

To my surprise, the local Apple dealer told me that in order to get a new switch, I had to purchase the cable soldered to it—a \$28 proposition. If I let the dealer repair the mouse, it would cost \$28 plus labor.

None of the local electronics distributors had the switch, so I checked Radio Shack, where I found a switch that works perfectly and costs a mere \$1.19. With its higher current rating, the Radio Shack switch is electrically superior to the

original one. The switch is a subminiature SPDT (single-pole double-throw) lever switch, rated for 5 amps at 250 volts. Its catalog number is 275-016.

To install the switch, first remove the lever attached to it using a pair of needle-nose pliers. Then remove the two screws holding the mouse together, desolder the old switch, and solder in the new one.

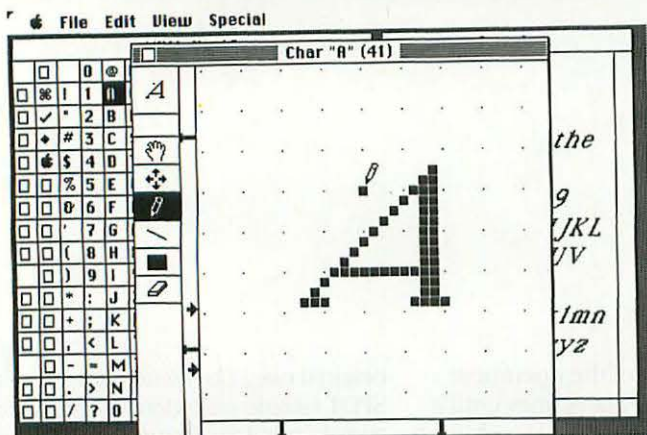
*Joey Memory
Knoxville, Tennessee*

A good tip, but do remember the rules of solid soldering: use a low-wattage soldering pencil (25 to 30 watts), attach the wires firmly for a strong mechanical connection before soldering, heat the connection, and let it, not the soldering iron, melt the solder. Use solder sparingly; you want a shiny, clean solder joint, not a crusty ball of lead. Most importantly, use a 60-40 rosin-core solder, not acid-core, which is for soldering house pipes and gutters. If you doubt your skills in man-to-mouse resuscitation, get help from someone who knows how to solder. Or pay the \$28.—Ed.

MacPaint Mirror Designs

Here's an easy way to make small, intricate designs and borders with *MacPaint*. First choose Brush Shape on the Goodies menu and click the single-dot brush, then choose Brush Mirrors and click on all four mirrors. Move the paint brush pointer to the center of the drawing window and drag it in a small, circular motion.

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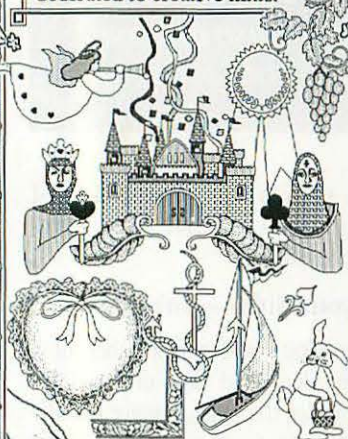
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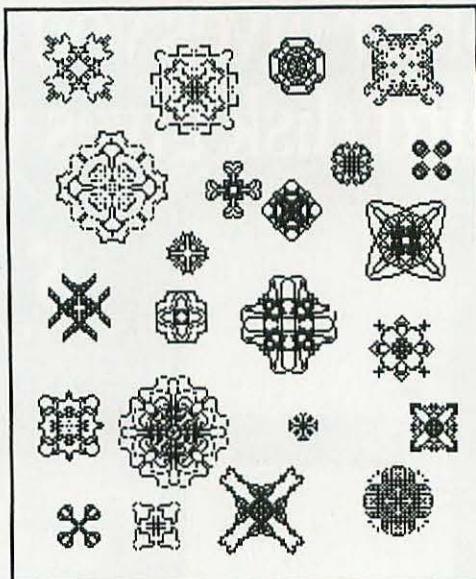


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Open Window



MacPaint Designs

To create intricate, snowflake-like patterns in MacPaint, use the single-dot brush with brush mirrors, and draw small circles near the center of the drawing window.

The mirrored image that results is an intricate design. Lasso the design and drag it while holding down the Option key to duplicate and link the designs to make a border [see "MacPaint Designs"]. You may want to experiment with patterns and mirror combinations.

Alan Hughes
Orlando, Florida

Unlocking MacWrite's Enter Key

The Enter key is often thought of as a special Return key and is most frequently used to respond to dialog box queries. I've discovered that in MacWrite the Enter key serves two more purposes.

If you hold down the Enter key while selecting text, the text is deleted as soon as you release the mouse button, eliminating the need to use the Backspace key to clear the text. The instant deletion works with double-clicks and Shift-clicks as well. To remove a word, for example, hold down Enter and double-click on the word.

The Enter key's other hidden function lets you find the insertion point in a lengthy document. Say you've finished reading a long document and want to return to the insertion point to continue typ-

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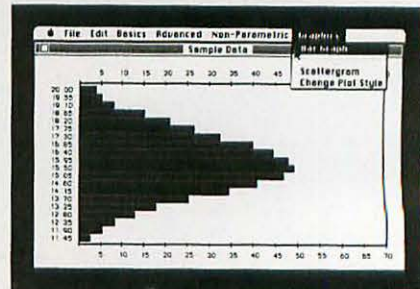
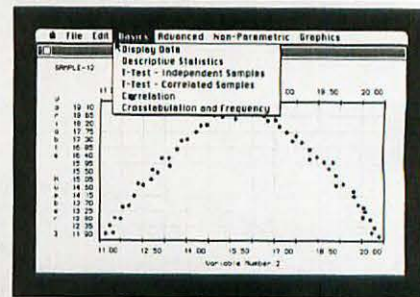
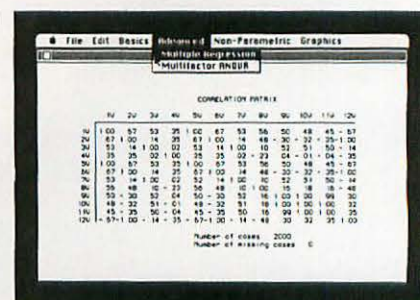
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ing. Instead of scrolling around in search of the cursor, simply press the Enter key, and the document scrolls to the insertion point.

David Snyder
Rochester, New Hampshire

After reading this tip, I was curious to see if Microsoft Word has similar shortcuts. Here's what I found: if you hold down the Option key while dragging, the blinking insertion point moves along with the I-beam cursor. You can quickly delete a word using this technique. Hold down the Option key and drag to the word you want to delete. Then, while still holding down Option, press Backspace. Then release everything—the mouse button and the two keys. The word will be selected and then deleted.—Ed.

On the Menu

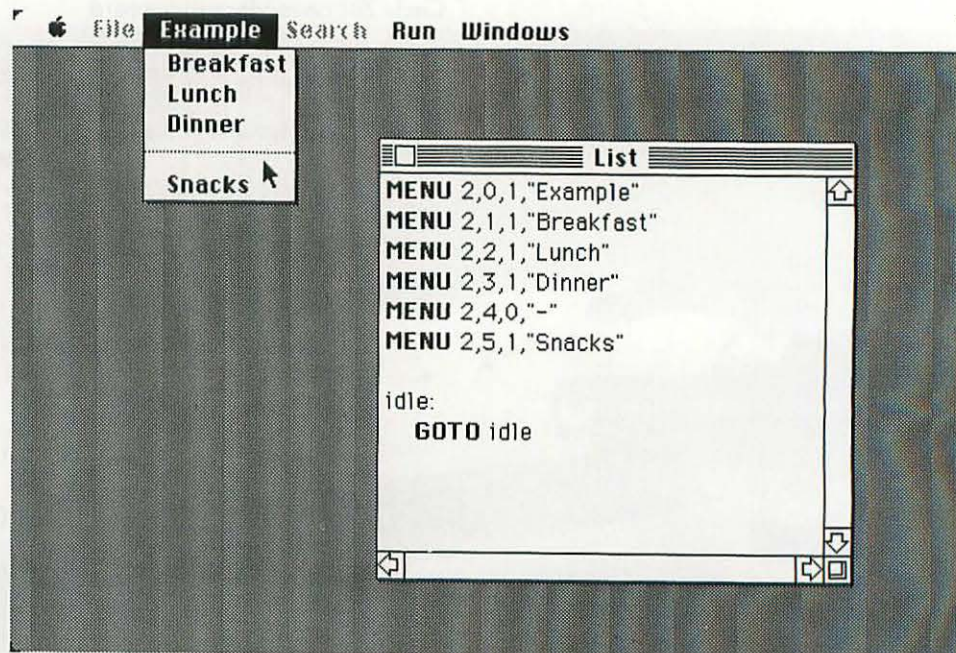
I've found an undocumented feature of Microsoft BASIC 2.0. Using a hyphen as a menu title produces a line of dots across the menu [see "MBASIC Menu"]. Such a line is often used in Mac applications to separate groups of commands.

Edward Rozema
Harrison, Tennessee

Since the dotted line in a menu is for visual separation only, remember to use zero as the state argument in the MENU command. The zero disables a menu item, making it dimmed and impossible to choose. You don't want the dotted line to look as if it were a legitimate command when you drag across it.—Ed.

Battle of the BASICs

Microsoft recently previewed version 2.1 of its BASIC. The new version functions identically to version 2.0, except its performance has been improved. To see just how much it's improved, we ran a prime-number-generating program on both the binary (B) and decimal (D) versions of Microsoft BASIC (MBASIC) and on a pre-release version of Apple's Macintosh BASIC. Macintosh BASIC ran the program in 353 seconds. MBASIC 2.0B ran it in 1019 seconds, while 2.0D turned in a 1038-second time. MBASIC 2.1B cut its predecessor's time almost in half, taking 661 seconds, while 2.1D completed the test in 665 seconds.



MBASIC Menu

To produce a line of dots between menu items, use a hyphen as a menu title. Remember to use zero as a state argument (the third argument in a MENU statement) to prevent the line of dots from being chosen as a command.



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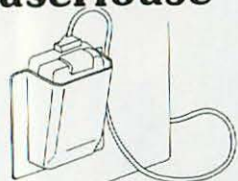
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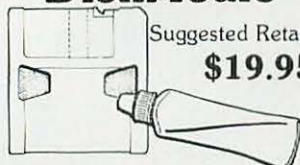
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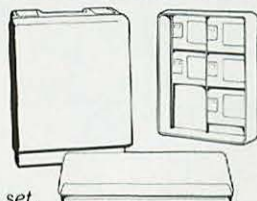
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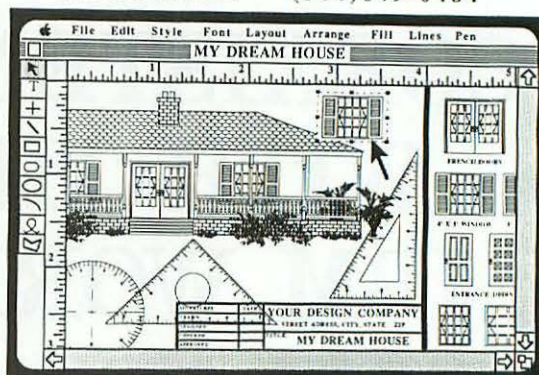
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Apple's Macintosh BASIC won the race primarily because it compiles a BASIC program into a compact intermediate code and then interprets that code when you run the program. Both versions of MBASIC, in contrast, simply interpret the original code, a more time-consuming process.

The benchmark test that we ran measures only a language's array-handling and integer arithmetic performance. It does not test other important areas of language performance, such as disk and screen access or string manipulation. If you've done any tests in these areas, we'd like to see your results and your test programs. Keep in mind that the versions of MBASIC 2.1 and Macintosh BASIC we used were pre-release versions. The performance of the final versions may differ slightly.—Ed.

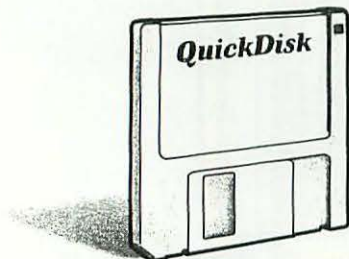
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| 119 | Word by Microsoft — Mac's word processing program. Capable of merging mailing lists and will "window" up to 4 pieces of work. | 160 | OverVue by ProVue — A database management system which will enable you to organize mailing lists, inventories. | 239 | MacVision (a digitizer) by Koala — Digitize pictures or objects. Video camera required. |
| 99 | Basic new version by Microsoft — Put control buttons in windows, invent menus for a menu bar and dive into Mac's graphics. | 89 | Layered — Will schedule, keep track, analyze, and report, the cost efficiency of your business. Coordinates time and use of your people. | 29 | Infocom Games — Zork I • Zork II • Zork III • Hitchhiker's Guide to the galaxy • Infidel • Enchanter • Starcross • All \$29.00. |
| 89 | Dollars and Sense by Monogram — A home accounting package. Just right for the small business. Bar and pie charts, etc. | 89 | Mighty Mac by als — A comprehensive desktop tool. Replaces your calendar, appointment book, note pad, telephone directory files. | 29 | Airborne! by Silicon Beach Software — A battle game with the most dramatic and realistic sound generation available on Macintosh. |
| 104 | 1st Base by DeskTop — Create your own files. Enter, edit, sort on multiple fields and produce reports from single or joined files. | 85 | ThinkTank by Living Vidiotext — Organize ideas in a logical manner. Its flexible outline format creates a spreadsheet for ideas. | 35 | Verbatim by DataLife — A 3.5" single and doublesided precision floppy disk. |
| 55 | 1st Port by DeskTop — A communication package which enables you to convert different data formats with a variety of Macintosh programs. | 119 | MegaFiler by Megahaus — A file management system that lets you file and retrieve information. Mailing lists, orders, invoices, inventory. | 35 | Xidex Precision disks — A new product line of precision 3.5" disks developed for high density applications. |
| 55 | 1st Merge by DeskTop — Merge your MacWrite documents, memos, and letters with your own data file to produce mass mailings. | 75 | MegaMerge by Megahaus — The mail-merge program for MacWrite. Create form letters, print mailing labels, and combine documents. | 9 | FlashPad — A brand new pad for your mouse. Flashware introduces a larger, more durable way to move your mouse around. |
| 220 | Mac Lion by CDS — A powerful database management system. Write an order entry system or build an invoicing system, pull down menus. | 175 | MegaForm by Megahaus — A revolutionary new product enabling you to create any business form. And then will fill them in automatically.
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Open Window

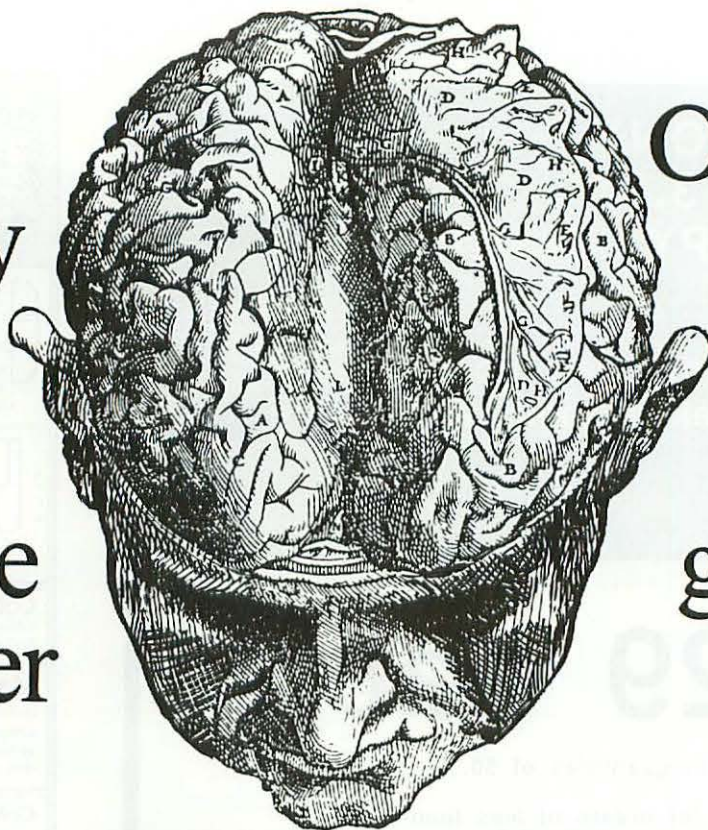
the Volksmodem's DIN connector, the orange wire to pin 2, the white wire to pin 3, and the black wire to pin 4. Cut and tape the remaining wires, and you have a professional-looking cable.

*Patrick DuBois
Richmond, British Columbia
Canada*

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*Jim Heid is a Contributing Editor of
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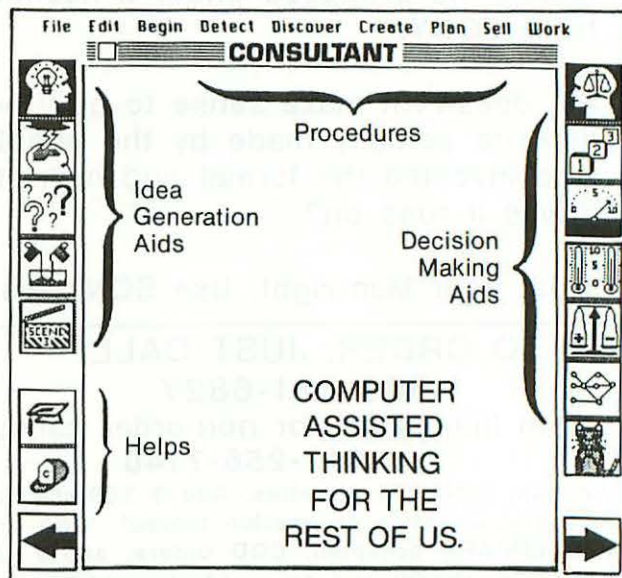
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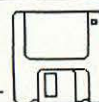
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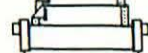
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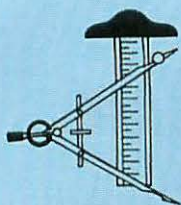


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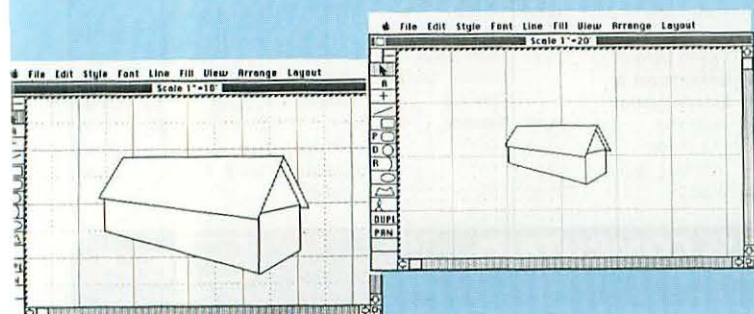
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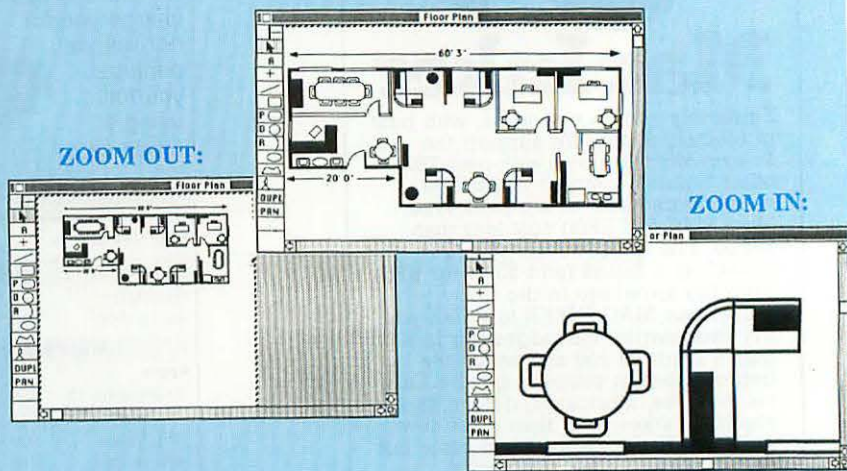
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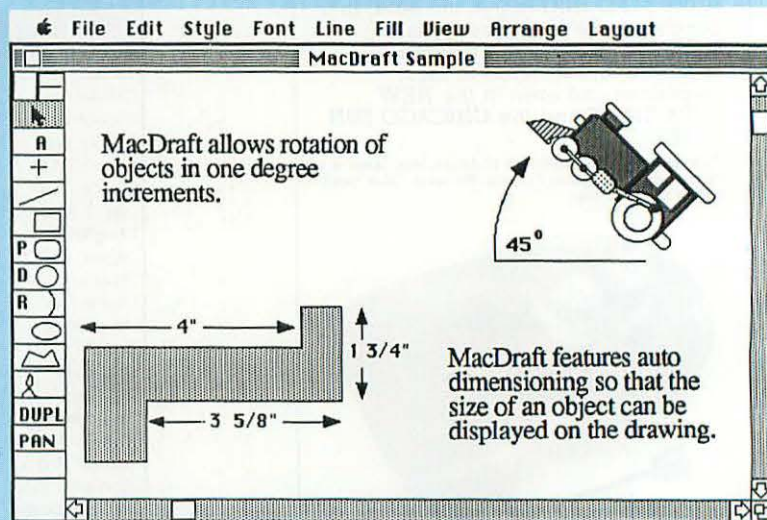
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Macworld Gallery

An exhibition of Macintosh graphics

Edited by Erfert Nielson

In addition to the three Macworld Art Contest winners, this month's Gallery features a special exhibit of drawings done by children 5 years of age and younger.

To enter the Macworld Art Contest, send a paper copy of your drawing and a description of how you created it to Macworld Gallery, 555 De Haro St., San Francisco, CA 94107. The first-place winner receives \$500 and a Summagraphics MacTablet; two runners-up receive \$250 each. Prize-winning drawings become the property of Apple Computer.

■ \$500—First Prize

Crow

This drawing represents an effort to draw in a spontaneous way with the Mac. I began with a wide black brush and later used white brushes. I made quick, freehand brush strokes rather than laboring over details. After I made a sketch, I printed a copy to serve as a guide to the placement of lines and patterns. Then I copied and dragged sections of the drawing, moving as quickly and freely as I did when I made the brush strokes.

*Pat Perrin
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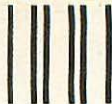


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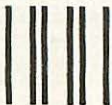
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Montage

This drawing started out as a doodle in which the outline of one small shape fit into another, as in a jigsaw puzzle. The drawing grew until it finally filled an entire page. I used a thick brush to outline areas and the paint bucket to fill them in. I frequently went into FatBits to work on details.

Sam Schofield
London, England



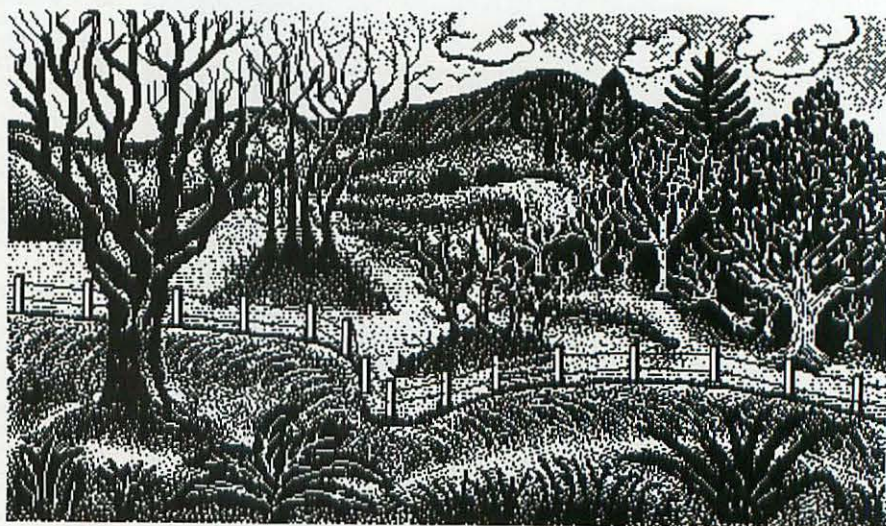
Montage

■ **\$250—Second Prize**

North Country

This drawing is of a north-eastern country landscape in late fall. I used the spray can with a variety of patterns, altering the patterns slightly so they wouldn't appear too uniform. I drew the trees, the fence, and the background with a number of different brush tips.

Paul Comer
Milpitas, California

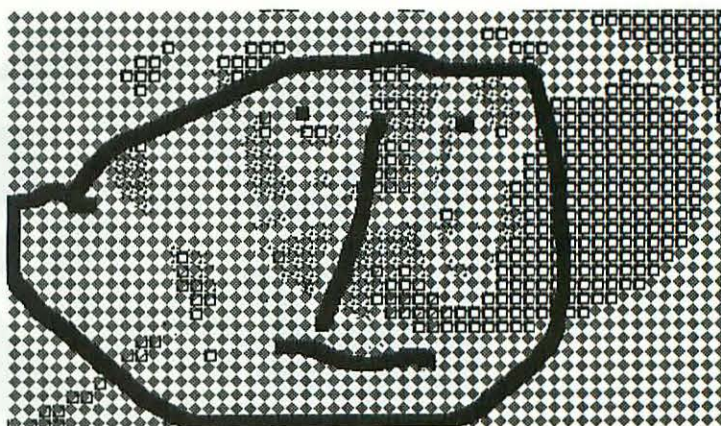


North Country

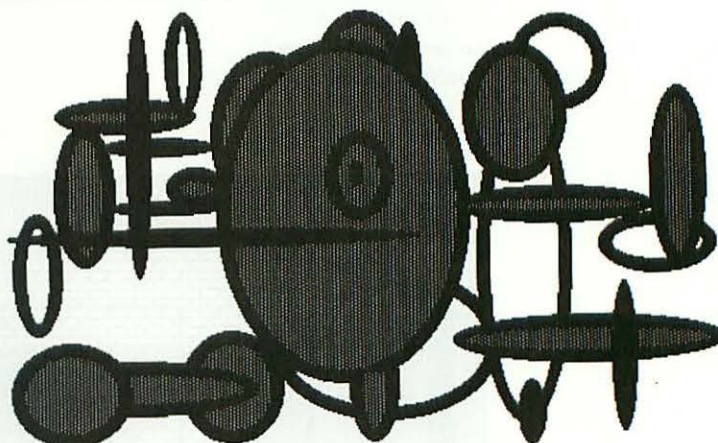
Children's Gallery

The drawings exhibited here are the efforts of children aged two through five turned loose on their parents' Macs. *MacPaint* features such as Brush Mirrors, the paint bucket, and stretchable geometric shapes give young children a degree of control not available to them with traditional drawing tools. Children in this age group generally find the mouse easier to hold than a crayon or a pencil and are able to create amazingly sophisticated compositions. Many of the parents who sent their kids' creations to *Macworld Gallery* were unable to provide the obligatory description of how the drawing was created because they weren't in the room when it happened. I consider this a tribute to *MacPaint*'s ease of use.

(continues on page 192)

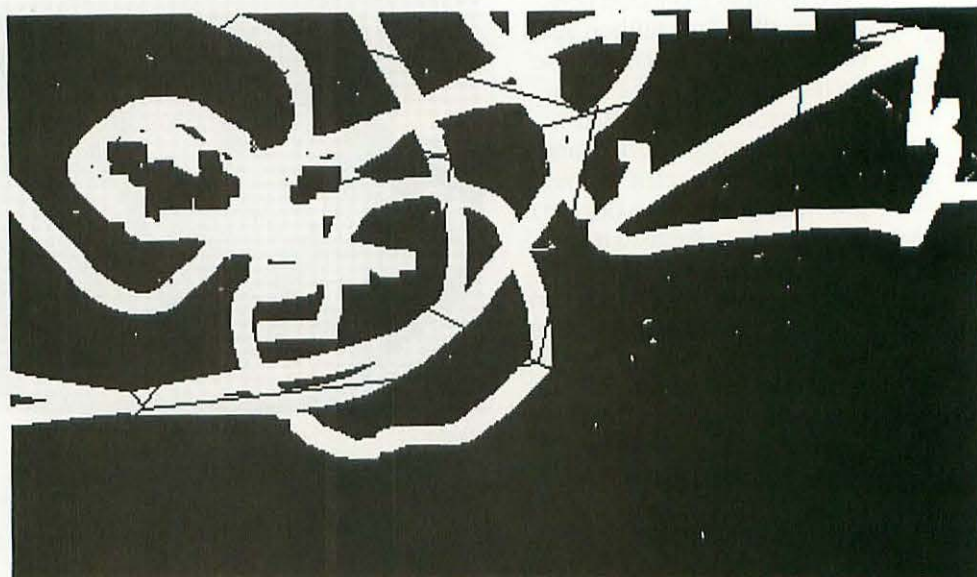


Hippo
Merle Dickerson Zimmermann, age 2
Silver Spring, Maryland

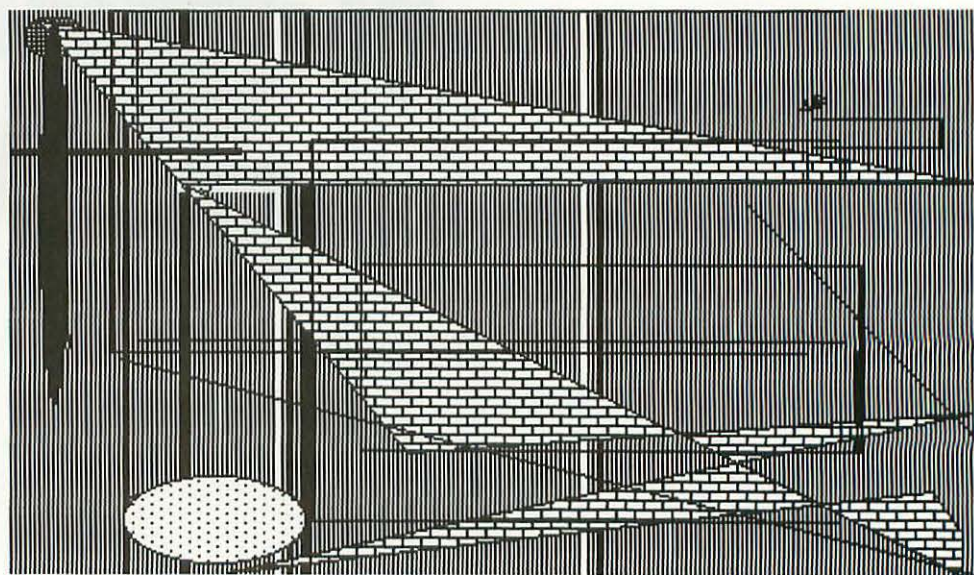


Untitled
Ann Kolbeck, age 3
Albuquerque, New Mexico

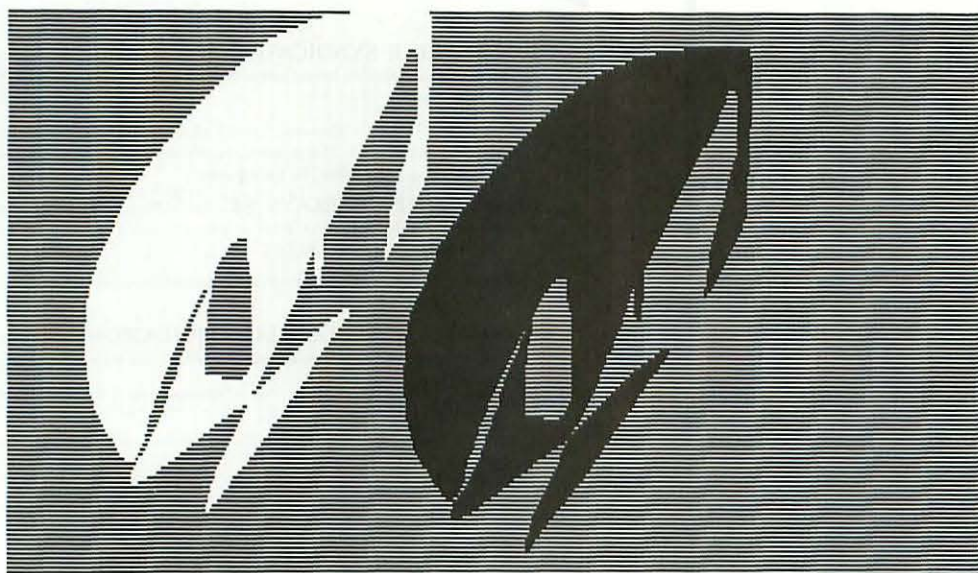
Children's Gallery (continued)



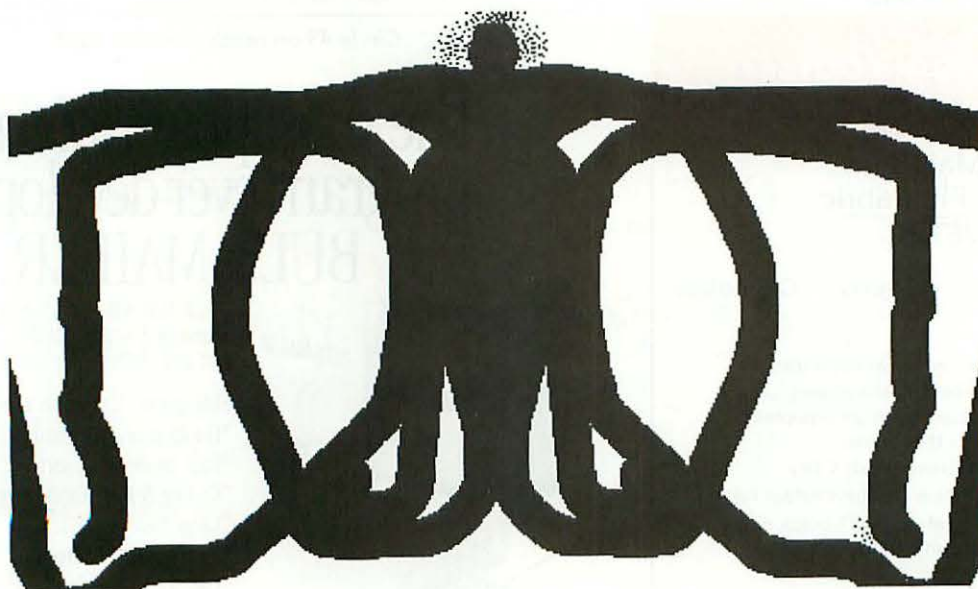
Spider on Its Web
Jamie Barringer, age 5
Pueblo, Colorado



Untitled
Justin Schreiner, age 3
Alexandria, Virginia



Spider
Nicky Monsour, age 4
Hollywood, California



A Girl
Leland Carey, age 4
Gladstone, Michigan

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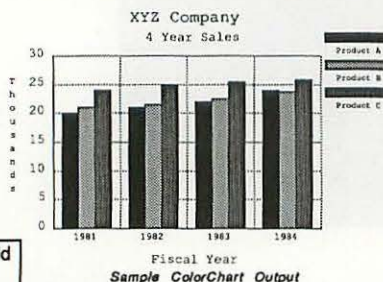
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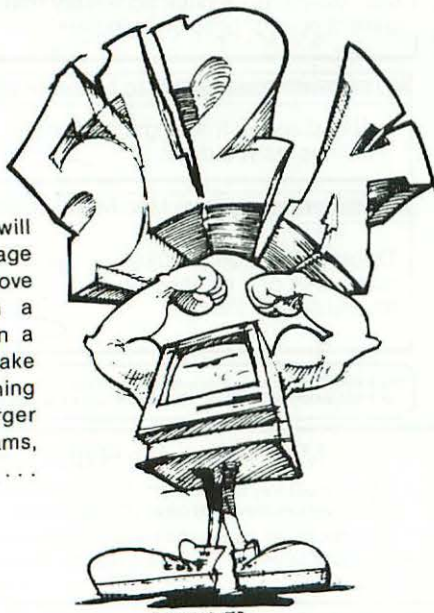
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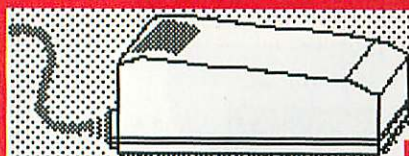
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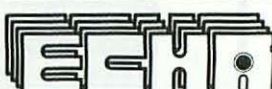
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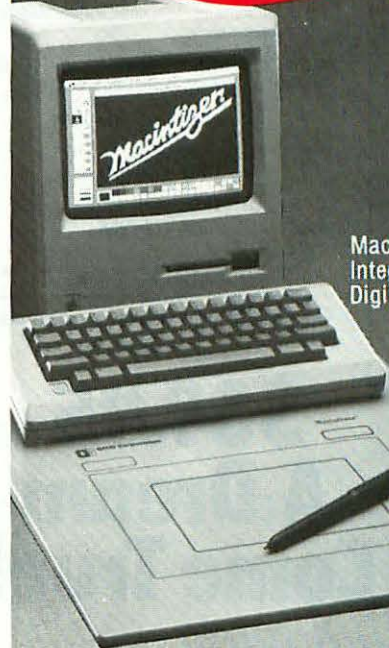
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- *10 megabyte fixed hard disk plus 5 megabyte removable disk
- *Two 5 megabyte removable disks

If you'd like to see a Macintosh working to the max, stop in at your nearest Tecmar dealer for a MacDrive demonstration. To find out who that dealer is, call Tecmar at 216/349-1009.



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